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THE

JOURNAL OF BOTANY,

BRITISH AND FOREIGN.

EDITED BY

BERTHOLD SEEMANN, PH.D., F.L.S.,
ADJUNCT OF THE IMPERIAL L. C. ACADEMY NATURÆ CURIOSORUM.

"Nunquam otiosus."

VOLUME VI.

With Plates and Woodcuts.

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Fig. 1.
Fig. 2.
Fig. 3.

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MORCHELLA CRASSIPES, *Pers.*, A NEW BRITISH MOREL.

By W. G. Smith, Esq.

(Plates LXXIII. and LXXIV.)

Those who believe that our flora is so well known that none but microscopic species remain to be discovered will be surprised at the magnificent Morel of which we give a figure, and which is entirely new to Britain. It was first found in a hedgerow near Kingskerswell, South Devon, by Miss Lott, of Barton Hall, at the end of last April; the first specimens were sent on to me for identification, and it has since been found elsewhere.

The proportions it attains can be well seen in our figure, and, when well grown, is one of the finest Fungi of our flora; the spores are oval, yellow, and depressed, having a length of ·0007–·0008 in., and a breadth of ·00032–·00042 in. The substance of the flesh is not so firm as that of our common Morel (*Morchella esculenta*, Pers.), and is not so readily dried; it becomes moist, and is apt to decompose. It is, however, excellent for the table, and with a little pains may be readily dried for winter use.

Streinz, in his 'Nomenclator Fungorum,' has referred *Morchella crassipes*, Pers., to *M. semilibera*, DC., but that is evidently an error, for Persoon's description is exactly the same with that of Ventenat and De Candolle.

Morchella crassipes, Pers.; pileo subconico, fusco, basi adnato; costis irregularibus, undulatis, crassis; areolis polymorphis, magnis, profundis, imo fundo celluloso-plicatis; stipite magno, elato, basi incrassato, lacunoso, supra attenuato, glabro, subincarnato.

Morchella crassipes, Persoon, 'Synopsis Methodica Fungorum,' 1801, p. 621; De Lamarck et De Candolle, 'Flore Française,' vol. ii. p. 213.

Phallus crassipes, Ventenat, 'Mémoires de l'Institut National,' 1798, p. 509, tab. 2.

Explanation of Plates LXXIII. and LXXIV.

Fig. 1. *Morchella crassipes*, Pers. 2. Section through walls of pileus. 3. Spores; the last figure magnified.

ON THE COMMERCIAL KINDS OF INDIA-RUBBER, OR CAOUTCHOUC.

By James Collins, Esq.

What is India-rubber, or Caoutchouc?—It is not a true gum or resin; yet, being an inspissated juice, it is generally classed among them. By some it is termed an elastic gum, but this is incorrect, as gums are soluble in water, and caoutchouc is not. The nearest, however, to which it agrees are the gum-resins, being opaque, not melted by heat, but only softened and swelled out, regaining when cold its original form. It differs, however, from them in one important respect; whereas gum-resins are partially soluble in water, caoutchouc is not in the least. Thompson, in his 'Organic Chemistry of Vegetables,' classes it amongst the "neutral vegetable principles." If stretched quickly and allowed to regain its form, a great deal of latent heat is disengaged, as will be felt by placing a piece against the cheek during the operation. When solid it cannot be dissolved by acids, alcohol, or water, but it is soluble in ether, or in the better known and used naphtha. The milky juices yielding caoutchouc are found in the middle layer of the bark called the *mesophleum*, stored up in anastomosing tubes known as laticiferous tissue. In the *Apocynaceæ* latex-vessels occur also in the liber, or endophleum. The milky juice, when allowed to stand, separates into two parts, by the globules of caoutchouc

coalescing together and leaving a thin fluid behind. In several bottles of milk, Thompson found that though they were hermetically sealed, yet about 40 per cent. of the contents had separated, in the form of a lining of caoutchouc. Faraday was more fortunate in obtaining bottles in which only about the proportion of one-fifth had separated in the form of caoutchouc, the liquid being of a pale yellow colour, thick, like cream, and forming a solid sheet of caoutchouc when poured on any solid substance. Pure india-rubber is of a pale yellow colour, having no taste or smell; the colours found in the commercial varieties resulting either from admixture of bark, atmospheric influence, etc. At 32° it is hard and very slightly elastic, at 60° to 70° soft and pliable.

I. American kinds of India-rubber.

One of the earliest notices of the use of india-rubber is given by Herrera in his account of Columbus's second voyage; where, speaking of the natives of Hayti, he says, "They had other amusements, such as the game of ball, for which they had a house set apart, and they played it so many on each side, without sticks or bats, for they struck the balls with any part of their bodies, and with great dexterity and nimbleness. And the balls were of the *gum of a tree*, and although large, were lighter and bounced better than the wind-balls of Castile." (Herrera, Historia, decada i., libro iii., cap. iv.*)

The first account of a tree yielding india-rubber—*Castilloa elastica*, Cerv.—is given by Torquedama, whose work was published in the latter end of the sixteenth century, and who, speaking of Mexico, says:—

"There is a tree which the Indians call Ulequahuitl; it is held in great estimation, and grows in the hot country. It is not a very high tree; the leaves are round and of an ashy colour. This tree yields a white milky substance, thick and gummy, and in great abundance. To obtain it, the tree is wounded with an axe or cutlass, and from these wounds the liquid drops. The natives collect it in round vessels of different sizes, called, in their language, Xicalli, but by us calabashes. In these they allow it to settle in round balls of the size most convenient for the purposes to which they are about to apply them. When quite set they boil them in water, in which state the gum is called Ulli. The Indians who have got no calabashes, smear their bodies over with it (for Nature is never without a resource), and when it becomes dry they remove the whole incrustation, which comes off in the form of a very smooth membrane, its thickness depending on the will of the party collecting. They then make

* For a translation of this account, and many other useful hints, I am indebted to Dr. Spruce.

it into balls and boil them as before. Anciently they used to play with these balls, striking them against the ground, and making them rise to a great height. But in the game of pelota it was not struck against the ground, but caught upon the hip or shoulder. From the ulli an oil is extracted of great value in various applications. It was formerly much used by the natives, nor have they forgotten its properties now, for it is soft and lubricous, and of especial effect in removing any tightness of the chest. The oil is extracted from the ulli by heat; it starts out in a manner to excite admiration, leaving nothing to compare it unto. The oil is drunk mixed with cocoa, and indeed it softens any other medicine, however hard its quality. It is also found of great service in stopping hæmorrhage, for which it is taken internally. The coagulated ulli is so strong in itself, that a breastplate made of it no arrow will pass through; for being of a nature leathery and membraneous, it ejects the point. The kings and nobles were accustomed to make shoes of the ulli, and to order the fools and jesters, the humpbacked and dwarfs of the palace, to be shod therewith, in order to make them sport, for the wearers could not step without falling, which, with their awkward actions, gave rise to much jesting and merriment. Our people (*i. e.* the Spaniards) used it in waxing their cloaks, which were made of coarse canvas, so as to make them resist water; and, in truth, it is of great effect in resisting the water, but not so the sun, for the rays thereof melt it."

For our first accurate information respecting the india-rubber yielded by different species of *Hevea* (= *Siphonia*), we are indebted to M. de la Condamine, who, together with three fellow-academicians, was dispatched in 1735 on an astronomical mission to South America, and who sent a short notice of his discovery to the French Academy in 1736, subsequently furnishing the following account:—

"The resin cahout-chou, in those countries of the province of Quito adjacent to the sea, is very common also on the banks of the Marañon, and serves for the same uses. When it is fresh, they work it with moulds into what shape they please, and it is impenetrable by the rain. But what renders it most remarkable is its great elasticity. They make bottles thereof, which it is not easy to break; boots and hollow bowls, which may be squeezed flat, and when no longer under restraint resume their first form. The Portuguese of Para have learnt of the Omaquas to make squirts or syringes thereof, which have no need of piston or sucker. They are made hollow in the form of a pear when scooped, having a little hole at the small end, to which a pipe of the same size is fitted, they are then filled with water, and by squeezing them they have the same effect as a common squirt. This machine is in great vogue among the Omaquas; when they meet together by themselves for any merrymaking, the master of the house never fails to present one to each of his guests, and the use of the squirt with them is always the prelude to their most solemn feasts." This use of india-rubber led to the names of Seringa and Siphonia, and by the Portuguese, "Pao de Zirringa."

After Condamine left South America, an engineer, named Fresnau (who had lived in that country for many years), having seen many articles made of india-rubber, endeavoured to find out its source. After many inquiries, he at last obtained from some fugitive Indians models in clay of the fruit and leaves. These he distributed about the country, in the hopes of discovering the hitherto-unknown trees. His ingenious plan met with success, and he had the satisfaction of making boots and other articles out of the substance. The French Academy published an account of his discovery in 1751.

Aublet seems to have been the next who contributed some information on the subject. In his 'Flora of Guiana,' published in 1775, he says that the fruit of *Hevea Guayanensis* is much sought after by the natives for food, and that caoutchouc is collected in the following manner :—

"The natives begin by making at the base of the trunks a deep gash into the wood. They then make another incision from the upper part of the trunk, vertically downwards to the former one, and, at various distances, a number of oblique incisions running into the first. These incisions form channels for the oozing sap, and convey it into a vessel placed for this purpose at the foot of the tree. In this the sap collects, loses its moisture, and becomes a soft elastic mass, which, when quite fresh, is readily made to take the shape of any instruments or vessels upon which it is applied, layer after layer. These are then dried by exposure to the fire. The moulds are sometimes made of unbaked clay, and afterwards removed by pouring in water to soften them, so that the caoutchouc alone remains. Sometimes they are made of baked clay, and removed by being broken to pieces, the elasticity of the caoutchouc enabling it to bear the violence necessary without injury to its structure."

For a considerable time this kind of india-rubber remained a scientific curiosity, its only application being for rubbing out dirt and pencil-marks, thus giving rise to its name. Dr. Priestly was the first who warmly recommended it to artists for this purpose. Mr. Naire, an instrument-maker, advertised, in 1771, india-rubber for "drawers in pencil, in cubical pieces of half an inch, for three shillings each."

Edwards, in an account of a voyage up the Amazon, says about a certain island and the india-rubber trees (*Hevea* sp.) there met with :—

"This island was covered with a fine forest, in which were abundance of Seringa trees all scarred with wounds. We made some incisions with our tresados, and the milk oozed out, and dripped in little streams. Its taste was agreeable, much like sweetened cream, which it resembled in colour. These trees were often of a great height, and from 2 to 3 feet in diameter, the trunks

were round and smooth, and the bark was of a light colour and not very smooth: the wood was soft, and we easily cut off a large root and brought it away with us. The top of the Seringa is not very wide-spreading, but beautiful from its long leaves, which grow in clusters of three together, and are of oblong, ovate shape, the centre one rather more than a foot in length, and the others a little shorter. We found also the fruit of the Seringa; it is ligneous; the size of a large peach, and divided into three lobes, each of which contains a small black nut."

Of the caoutchouc obtained from South America, the best and most valuable is that known as *Para india-rubber*, the produce of *Hevea Guayanensis*, Aub. (*Siphonia elastica*, Pers.; *S. Cahuchu*, Willd.), and other species of the same genus. In a paper in the 'Kew Journal of Botany' (1854, p. 369), by Mr. George Bentham, on plants collected by Dr. Spruce, the following notes occur on the subject:—

"*Siphonia Brasiliensis*, Willd. (*Hevea Brasiliensis*, Muell.). In the forests of Para. A lofty handsome tree, branching from the base, and yielding the caoutchouc the most abundantly exported."—*R. Spruce.*

"*S. lutea.*—From the forests of the Rio Uaupés. A tree of 70 feet; the milk copious, speedily turning black, and staining linen permanently. When dry, elastic and very tenacious."—*R. Spruce.*

"*S. discolor.*—Scarcely elastic when dry."—*R. Spruce.*

"*S. paucifolia.*—A large tree, 40 to 50 feet high, yielding a copious milky juice."—*R. Spruce.*

"This genus seems abundant throughout the Amazon, but not all the species yield caoutchouc (or xiringue, as it is here called) of good quality, those of the Gapó and Caatinga producing a brittle gum."—*R. Spruce, ms.*

In a paper by Dr. Spruce on the india-rubber of the Amazon (Kew Journ. Bot. 1855, p. 193), he says:—

"On the upper Rio Negro and lower Casiquiare are two species—*Siphonia lutea*, Spr., and *S. brevifolia*, Spr., known respectively as the long-leaved and short-leaved Seringa. The former yields most milk, but neither are so productive as the Seringa of Para (*S. Brasiliensis*). Both are straight, tall, and not very thick trees, with smoothish, thin bark, and yellow, very odoriferous flowers. I suppose their average height may be about 100 feet. I cut down a tree of *S. brevifolia*, near San Carlos, which measured 110 feet. I first saw and gathered *S. lutea* in the mouth of the Uaupés; and as I came down the Rio Negro in December, 1854, I found a rancho erected on the spot, and a person employed in extracting rubber from the same trees as I had taken the flowers."

In a letter received in last October, Dr. Spruce kindly informs me

that caoutchouc is obtained at Para from *Siphonia Brasiliensis*, Willd. (and probably from several other species); on the Amazon, about the mouth of the Tapajoz, from *S. Spruceana*, Benth.; towards the mouth of the Madeira are other species not seen by him in good state; on the Rio Negro, Haupés, and Casiquiare, from *S. discolor*, Spruce, *S. rigidifolia*, Spruce, *S. lutea*, Spruce, *S. paucifolia*, Spruce, *S. apiculata*, Spruce, and from two other species. The india-rubber is collected by Indians, who generally unite together in large numbers for this purpose. In the province of Para it was computed that 25,000 persons were engaged in its collection in 1854. The greatest difficulty is in cutting a pathway through the forest. By some the trees are either cut down or bound with boughs at top and bottom, and the milk drawn off at one operation,—thus destroying the trees; but by far the commonest method is that of tapping. After a tree has been once tapped, it requires rest for about two years to recover its strength. When the trees are flowering, nearly all the milk goes to nourish the flowers, and scarcely any from the trunk is then to be obtained; but if a panicle be cut, the milk starts out in large drops. A small quantity of alum is put along with the milk, as it assists the coagulation of the caoutchouc, whereas ammonia has the contrary effect. After the milk is collected, the Indians gather heaps of Urucuri nuts (the fruit of *Attalea excelsa*, Mart.), which give off a thick white smoke. They then dip their clay moulds in the milk, and holding them over the fire, repeat the dippings till a sufficient thickness has been obtained,—thus giving rise to the laminated appearance observable in Para bottle rubber. By some this smoking process has been questioned; but Dr. Spruce, in his letter, says, "India-rubber was certainly smoked when I was on the Amazon. The smoke used was produced by heating (toasting or roasting, not properly burning) the hard but somewhat oily nuts of the Urucuri Palm (*Attalea excelsa*, Mart.). It was very white and vaporous, and deposited no fuliginous matter whatever. A recently-made smoke-dried india-rubber shoe was of a straw-colour, or pale yellow brown; so that Martius was wrong in supposing 'Incolæ fructus tostos ad fumigandum succum *Siphoniæ elasticæ* adhibent, ut resinæ elasticæ *nigrum colorem* comparent.'" The mistake, I believe, has arisen from the change of colour from the yellowish-white to brownish-black tinge, which Para rubber assumes on exposure to the atmosphere, being attributed to the action of the smoke; whereas,

in all the specimens examined, I have invariably found the centre unchanged in colour, and no trace whatever of any fuliginous deposit between the laminæ. Frequently I have cut off all the exterior portions of a piece of this kind of rubber, and have noticed how soon the cut edges assume the browny tinge on exposure.

There are three or four forms in which we receive Para caoutchouc in this country :—1st, flat pouches, called biscuit; 2nd, the well-known bottles; 3rd, Negrohead; and 4th, scrap. The "biscuit" consists of all the fine rubber, carefully prepared. It is made in the same manner as bottles, by successive dipping,—thus showing a beautifully-even, laminated appearance. The necks are very narrow, thus necessitating cutting the sides to let the mould out. The "Negrohead" consists of all the "scrap" left after the preparation of the fine, rolled into very large balls or blocks, sometimes about twelve inches in diameter. These offer an excellent opportunity for adulteration, which the Indians are not slow to avail themselves of. Sometimes a large piece of clay is found in the centre; and in one specimen, now at the Kew Museum, I found inside one or two rings of earthenware, a mass of roots, and a textile substance in the centre.

The value of the imports of Para rubber in 1866, as per customs lists, was £381,461; in 1865, £348,712; in 1864, £307,923; in 1863, £299,641. The lowest price ever paid is said to have been $7\frac{1}{4}$*d.* per lb., but now it is about 2*s.* 2*d.* In 1866, the price ranged from 3*s.* 1*d.* to 1*s.* $8\frac{1}{4}$*d.*, according to the stock and demand.

In January, 1866, I obtained a sample of india-rubber from Demerara, in the shape of small round bottles and balls. This is very much like the Para rubber; and as Demerara is mentioned by Dr. Lindley as one of the habitats of *Hevea Guayanensis*, Aubl., it is, in all probability, produced by it. However, it should not be forgotten that one other plant is mentioned as yielding caoutchouc in Demerara, viz. *Tabernæmontana utilis*, Arnott, called by the natives Hya-Hya. It is described by Arnott as "yielding a copious stream of thick, rich, milky fluid, destitute of all acrimony, and only leaving a slight clamminess on the lips. A tree felled on the banks of a small stream completely whitened the water in an hour or two." Dr. Christison found the milk to contain a small proportion of caoutchouc, and a large proportion of a substance of a nature between caoutchouc and the resins.

Some time since, a small parcel, described as "rubber milk," from Para, came into the market; but whether ever used I cannot say. It came in gourds and irregular lumps. It was hard, broken with difficulty, of a colour from yellowish-white to yellowish-brown; not at all elastic, except when heat was applied, quickly regaining its rigidity; burning quickly with a bright flame and dense black smoke. It was lighter than water. When placed in hot water, it quickly became soft, and much like gutta percha or balata gum (*Sapota Mülleri*). I forwarded a description of this substance to Dr. Spruce, and in his letter he says:—"The so-called india-rubber milk from Para you mention is probably the milk of trees of the Apocyneous genus called *Couma* in that region. I know two species, *Couma Guayanensis*, Aubl. (*Cerbera triphylla*, Rudge; *Collophora utilis*, Mart.); and *Couma dulcis*, Spruce, in Pl. Am. The milk of these trees is copious, sweet, innocuous, elastic when fresh, but not when dry unless heated. I had a cerecloth coated with it, to cover the roof of the piragoa in which I travelled on the Casiquiare, also Orinoco, etc., and found it impervious to rain." Subsequently, on the receipt of a specimen, Dr. Spruce wrote that he did not recognize it as the product of any *Siphonia*, and yet it might be. "If," says he, "it has been collected near the city of Para, it is probably the gutta-percha of the Para Cow-tree, called by the inhabitants 'Maceranduba' (*Mimusops* sp.); but if obtained on the Rio Negro, it may be from the Cow-trees of that region (*Couma* sp.)." In the 'Kew Journal of Botany' (vol. v. p. 239), the milk of the Cow-tree of the Rio Negro is described as "sweet, thinnish, and very viscid; when dry more brittle than caoutchouc, which it otherwise much resembles."

Occasionally we get small parcels of india-rubber from Ceara. It has a different appearance to those above mentioned, leaving it a matter of doubt as to the tree which produces it. It consists of reddish-brown, string-like pieces, rolled up in the form of a ball, and thus called Ceara scrap. Only small quantities arrive here, which are soon bought up at prices from 1*s*. 6*d*. to 1*s*. 9*d*. per lb.

Hancornia speciosa is another plant which produces a very fine caoutchouc, known as "Pernambuco rubber," the fruit of which Brazilians call Mangava or Mangaba. Gardner describes the tree as reaching to the size of an ordinary Apple-tree, though its small leaves and drooping branches give it more the appearance of the Weeping Birch. The fruit

is yellow, a little streaked with red on one side, about the size of an Orleans plum, and of delicious flavour. When in season, it is brought to Pernambuco for sale. Claussen, in his communication to the British Association in 1855, states that the plant is found "at a height of from 3000 to 5000 feet above the sea, on the plateaux of South America, between 10° and 12° S. lat." It occurs in abundance about Pernambuco and Olinda. I have not been able to obtain any specimen of this rubber.* A sale of a small parcel took place in Liverpool in July last, at 2*s*. per lb., proving it to be little inferior to Para rubber in value.

Castilloa elastica.—To this plant we are indebted for nearly all our india-rubber obtained from Central America, New Granada, Ecuador, and the West Indies. It is found in Mexico, all the Central American republics (viz. Guatemala, Salvador, Honduras, Nicaragua, and Costa-rica), Isthmus of Panama, West Coast of America down to Guayaquil and the slopes of the Chimborazo; it also grows in Cuba; and, if the early account of Columbus may be relied upon, in Hayti. The Spanish name of this tree is "Arbol de Ulé," or Ulé-tree, an exact translation of the Aztec "Ulequahuitl." On a specimen collected in Guatemala, in 1861, the collector says, "All the caoutchouc of Central America is derived from this tree, and that from Carthagena and Guayaquil probably from the same source." On some specimens in the Kew Herbarium, collected by Mr. Sutton Hayes, the following notes occur:—

"Leaves of the Ulé-tree, collected in San Salvador, May 15th, 1860. I also got ripe fruit from the same place at the same time. Sometimes the leaves are much larger than these. I have collected the leaves of this same tree on the Isthmus of Panama, at a small native town on the Rio Gatun, about six miles from the railroad. At this place I saw the natives making the caoutchouc; but the tree is most abundant on the Rio Trinidad, where there is an establishment producing very fine and pure caoutchouc from it. The caoutchouc furnished by this tree, when well cleaned and prepared, is very nearly equal to that of Para, some fine lots of it having been sold in New York for nearly as high a price as that from Brazil; but the finest specimens of the caoutchouc I ever saw were made from the milk of this same tree at Chinandega, in Nicaragua. Caoutchouc, within the last year, has been shipped quite largely from all the Central American ports at which the Panama Railroad Company's steamers touch."

* It is described as being of a yellowish colour, and very much like Para.

On another specimen, collected by Dr. Spruce in Ecuador, in December, 1860, are the words, "The India-rubber Tree of Guayaquil."

Of the different commercial kinds of india-rubber furnished by *Castilloa elastica*, Cerv., we may mention :—1. West India (so-called); 2. Carthagena; 3. Honduras; 4. Guayaquil; and 5. Guatemala;—all named after the places whence shipped. Indeed, they are so very much alike in character, that a merchant dealing largely in them told me that they were all the same,—the different amount of careful treatment they received resulting in the improved look of the better kinds.

West India rubber is not, in most instances, the produce of any of the West India islands, but is named so from the mail steamers calling at St. Thomas on their way home. The best is pressed into thin clean sheets, devoid of the excessive moisture and "tarry" look perceivable in the lower kinds. It is a black-looking india-rubber in appearance. The quantity brought to England by the West India mail steamers very seldom exceeds 15 tons a month, the usual quantity being from 3 to 6 tons. It is much valued, I believe, on the Continent.

Carthagena india-rubber is imported in the form of sheets about three-quarters of an inch thick, and can always be distinguished from the other kinds by having a peculiar chewed appearance externally, most probably arising from the pressure used in driving off the moisture. 1*s*. 7*d*. to 1*s*. 8*d*. is about the average price. By skilful treatment this rubber has been used for many purposes for which Para alone could formerly be used. Formerly it was 8*d*. to 1*s*. 2*d*. cheaper than Para; now there is only about 6*d*. difference. It is black, tough, and occasionally "tarry" in appearance.

Honduras india-rubber has a greenish-grey appearance when cut, the exterior being dark. It is firm in texture, and not porous. Its price is 1*s*. 5*d*. to 1*s*. 6*d*. per lb.

Guayaquil india-rubber comes over in large black flakes or lumps. When cut, it is sometimes whitish, but in the lower kinds very porous, the pores being filled with a black liquid, which stains the hands and knife, leaving a disagreeable odour behind. Sometimes, by the mere pressure of the hand, a large quantity will exude. Its price is from 1*s*. 3*d*. to 1*s*. 4*d*.

Guatemala india-rubber is the worst kind. It is in large blocks, consisting of thin sheets pressed together. From between the sheets, when fresh, a black resinous thick fluid exudes. After a time this

fluid evaporates, and leaves a hard resinous substance behind, unaffected by hot water or steam. The rubber itself is jet black in colour, though, when purified from its resinous contents, I believe of a whitish colour.

Of those above mentioned, two—namely, Guayaquil and Guatemala —are, without doubt, the produce of *Castilloa elastica*. The so-called West India is also produced by the same plant. As to Carthagena rubber, if analogy of character be any criterion, I should say that, in all probability, it was also derived from *Castilloa elastica*. However, Dr. Spruce says, "I have often been told of a pinnate-leaved tree, yielding caoutchouc, which I could never fall in with. I am, therefore, unable to guess even at the family to which it belongs; but there is said to be such a one about Serpa, on the Amazon, and the same (or a cognate species) in some inland region of New Granada or Venezuela, whence it finds its way to Carthagena."

With regard to Honduras there may be a little doubt, on account of the character; but this may be the result of chemical treatment.

The following information has been supplied by M. Diezmann, of Greytown, Nicaragua, to Mr. John Collinson, C.E.:—

"'Ule' (or 'Tassa' of the Mosquito Indians) is an important article of export from Nicaragua; and San Juan del Norte, or Greytown, is the principal port whence it is shipped. Having for many years dealt in it, and having never seen a correct account of the manner in which it is collected and manufactured, I shall offer a few remarks on the subject. Expeditions for collecting Ule, or Nicaraguan india-rubber, are organized by a number of men clubbing together, and applying to one of the india-rubber dealers to furnish them with the necessary outfit, including provisions, blankets, machetes, axes, pans, pails, buckets, etc. They bind themselves before the local authorities to work a certain time for the dealer, and deliver to him the produce of their work. This formality gone through, the men—or Uleros, as they are now called—generally have a series of amusements, dancing, drinking, and gambling, until the dealer intimates to them that their departure ought not to be delayed any longer. All the necessary things are now embarked, and under the blowing of conch-shells and shouts of friends, the canoe shoves off. Often the poor fellows have to travel a fortnight before they arrive at their destination,—passing rocks and rapids, and being frequently compelled to unload their canoe

and drag it over them by sheer main force. At last, when arrived at their goal, their first object is to build a hut to live in, beds being made of sticks, and on stages a few feet above ground. A workshop is also built, if possible, as close as practicable to a river, a great quantity of water being required in the manufacture of the rubber. After an early breakfast, the men go to work, each man carrying a machete, a tin can capable of holding five gallons, and one or two wooden pails. As soon as the Ulero has selected his tree, he clears the surrounding ground of underwood and the stem of vines and epiphytical plants, and makes a ladder by tying pieces of cane two feet long to some of the tough vines about an inch and a half in diameter hanging from the tree. All this preliminary work gone through, the Ulero cuts diagonal channels in the bark of the tree, first from his right side, then from his left, so that both meet in the middle. At the bottom of the lowest channel an iron spout, about four inches long and two inches broad, is driven, underneath which a pail is put. By the time he has done cutting channels he has to hurry down, his pail being now quite full, and has to be emptied into the larger vessels, in which it is carried to the workshop. A tree 4 feet in diameter and 20 to 30 feet to the first branches will yield 20 gallons of milk, each gallon producing 2 lbs., and if rich, 2 lbs. 2 oz. of good dried rubber. A good working man is able to get from ten to twenty-five gallons of milk a day.* In the evening the milk is pressed through a wire sieve, so that all the impurities are excluded, before it is put into the barrels. When the barrels are full, the real manufacture of the rubber commences. This is generally intrusted to the most skilful of the party. The best manner of converting the milk into rubber is by mixing with it the juice of a certain vine, termed 'Achuca' by the natives,† which has the singular property of coagulating it within the space of five minutes. This vine generally abounds in the woods, and has fine large white flowers. Bundles of it are collected, and each stick well beaten with a piece of wood, and soaked in water, which is strained through a cloth, and about a pint of it is well mixed with every

* "By roaming through these now uninhabited forests, the Uleros occasionally come across remnants of a race of men now extinct; only recently they found a group of twelve well-made and excellently-preserved stone figures, placed in a circle around a high-place."

† From description given me, this must be some *Apocynea*.—BERTHOLD SEEMANN.

gallon of the milk. This is done in a large tin pan, in which it coagulates quickly, forming a soft mass floating in a brown fluid, and smelling like fresh cheese. This mass is slightly pressed by hand, placed on a board, and then rolled out with a piece of heavy wood. I have used with advantage an iron roller 150 lbs. in weight for this purpose. By this operation a great quantity of dark brown water is squeezed out, and the rubber, which has now assumed its elasticity, is in flat round pieces of $\frac{1}{4}$ to $\frac{1}{8}$ inch thick by 20 inches in diameter, and perfectly white. The weight of one of these pieces ('tortillas' the men call them) is about 7 lbs. The tortillas are hung up in a shed on poles to dry, which in fair weather takes about a fortnight; the rubber assumes then its dark colour, and weighs 2 lbs. a piece. If the vine is not to be had in the neighbourhood, two third parts of water are mixed with one-third of the extracted milk in a barrel, and this has to remain undisturbed for twelve hours; after this time the water is slowly discharged, and the residue—a dark cream—is put in vats made in the ground, and left to dry. The drying process takes from twelve to fourteen days."

Mr. N. Burgess, of Hackney, enables me to give the following notes on the microscopic structure of caoutchouc:—"In the dry sections of the different kinds no trace of any structure, save the mechanical laminated appearance, is observable. The identity in character between Guatemala, Guayaquil, Carthagena, and the so-called West India rubber, is very apparent. The resinous contents of Guatemala rubber look like so much Kowrie gum. Under polarized light, the substance has a somewhat granular appearance, possibly owing to the different degrees of purity of the substance itself acting by refraction; dissolved in chloroform, no trace of any structure, granular or otherwise, is perceivable."

Micrandra siphonioides, Benth., and *M. minor*, Benth., afford caoutchouc equal in their elasticity to that of the *Heveas;* but of their colour or other properties I cannot at present obtain any information.

Dr. Spruce collected a small piece of excellent caoutchouc, about the size of a walnut, from *Siphocampylos Jamesonianus*, DC.; but, as the plant is a mere herb, it cannot prove of any great commercial importance.

II. Asiatic kinds of India-rubber.

The attention given by different travellers and others to the rubber

found in South America, when its uses and properties became known, led to its discovery in many parts of the East Indies and the Archipelago. James Howison, a surgeon in Prince of Wales's Island, seems to be the first who discovered it there. In the 'Asiatic Researches' (vol. v. 1798) is a paper by him on this subject. He calls the tree "an elastic Gum Vine," and says that the tree has branches, sometimes 200 paces long. The Malays taste the juice to find which is the elastic variety. The usual manner of drawing off the milk was tapping, it taking a person two days to collect one quart. But the quickest way was by cutting the "Vine" into lengths of about two feet. The oldest vines produced the best caoutchouc, frequently yielding two-thirds of the milk's weight in caoutchouc. As to the experiments he made, he says that he made moulds of wax of different articles, as gloves, etc., and dipped them in the liquid caoutchouc. He also had the satisfaction of making himself a complete suit of waterproof clothing, by spreading fresh caoutchouc on cloth with a ruler and hanging it out to dry,—the mere exposure to the atmosphere rendering it firm immediately. Roxburgh, being in India, directed his attention to the subject, named Howison's plant *Urceola elastica*, and describes it as "a native of the islands of Penang and Sumatra, etc., and the Malayan countries. Stem woody, climbing over trees, etc., to a very great extent; young shoots twining and a little hairy; bark of the old woody parts thick, dark-coloured, and considerably uneven, a little scabrous. The wood is white, light, and porous." In describing a ball of india-rubber before him, he says, "Its colour on the outside is that of American caoutchouc; when fresh cut into, a light brown colour, till the action of the air darkens it; throughout, there are numerous small cells filled with a portion of the light brown watery liquid."

In the 'Singapore Local Reporter' of August 7, 1853 (Kew Journ. Bot., vol. v. p. 157), the following (relating to the produce of *Urceola elastica*, Roxb.), appeared:—

"This gum, the produce of creepers known in that part of Borneo under the names of Serapit, Petabo, and Menungan, is nothing else than the watery milk-like sap of these creepers, which by a simple process, in the addition of a little salt-water, takes the consistency and all the peculiarities of real india-rubber, being at first snow white, but by exposure to the air changing slowly to a dirty yellow and afterwards brown colour. The serapit produces the most common, the petabo the best, the menungan the greatest quantity of sap.

The gum obtained in this way contains water enclosed in small cavities, which we believe to have been formed by the celerity with which the sap hardens, preventing thereby the salt water, and perhaps the watery part of the sap, from finding an issue. . . . During our peregrinations in the jungle of Singapore, we have met with the identical creeper, called menungan in Borneo, but which the Malays here call ngerit, or ngret, and on inquiry have heard from the native wood-cutters that the same is found in great quantities in Johore and the neighbouring islands. . . . The process for obtaining the sap in use by the Badjows and the Muruts is very simple, but we should like to see an attempt made to obtain it in a manner less destructive to the plant. These people cut the creeper into small pieces of one foot to eighteen inches in length, allow the sap to flow into their jars or buckets, and put one end of the piece over a slow fire, whenever the sap does not flow quick enough. They, therefore, destroy the plant in order to obtain the juice. The creeper could also form a new branch of agriculture, for it grows fast enough to procure a supply of sap in less than three years, and after planting requires no further cultivation."

Mr. James Motley, in a letter dated at Singapore, March, 1854 (Kew Journ. Bot., vol. v. p. 285), thus describes this plant:—"A very abundant creeper was the india-rubber producing *Urceola;* its fruit is about the size of an orange, and colour of an apricot, the thick outer skin full of milky juice, while within are about eight or ten seeds enveloped in a tawny pulp, tasting like well-bletted medlars. The natives use the juice only as birdlime." Again, while at Sumatra, he writes (Kew Journ. Bot., p. 167):—"The plant yielding the best india-rubber, I think an *Urceola,* is common here; it is a large climber, as thick as a man's leg, with a dark rugged bark, it is called "Jintawan" by the Malays, but this includes three species,—menungan, serapit, and the petabo. The fruit of the serapit is the best, but all are much valued by the Malays, the pulp surrounding the seeds being very sweet, with a pleasant acid and a fine vinous flavour. To collect the sap, the stem is usually cut into billets a few feet long, from both ends of which the milky juice flows abundantly, and the plant soon springs up again. The gum is not collected among these islands, though the locality, always within the reach of the sea, is highly favourable, the only preparation required being to mix salt-water with the sap, the solid parts of which instantly coalesce."

Borneo india-rubber first came to England about three years ago under the name of gutta-susu; susu being the Malayan term for milk. This rubber, which fetches about 1*s.* 3*d.* per lb., is totally different from other Indian kinds; it is white, soft, spongy, very wet, and porous. In

a new specimen, it is no difficult matter to press out a large quantity of water having a saline taste. When old, it changes its colour to a dull pink or brown, frequently the cut portions being encrusted with salt after the water has evaporated. It has rather an unpleasant smell. This rubber is collected by the natives, and sold to the European traders. We have received it from Singapore; it may have been native, or imported from some of the neighbouring states. It has a wide range, and in De Candolle's 'Prodromus' (pt. 8, p. 358) the Malayan Archipelago, Sumatra, and Island of Penang, are mentioned.

The quotations given all refer to one and the same plant, and the descriptions given agree well with the characteristics of the Borneo rubber of commerce.

All the accounts agree in the mode of collection and treatment with salt-water, and before I met with these accounts I had made a note of the saltish taste of the water contained in it. As to the colour—an important consideration—Roxburgh had not the opportunity of having a perfectly fresh specimen; and it is well known how soon Borneo rubber, especially the more porous pieces, will change colour. Mention is made also of the white colour when fresh, and of its alteration when exposed to the atmosphere. Roxburgh and the 'Singapore Reporter' both refer to the "cellular" formation in this rubber. There is, moreover, no other description of East India rubber which would at all answer to the characteristics of the caoutchouc of *Urceola elastica*.

On a specimen of this plant in the British Museum, collected in Sumatra by Campbell, there is this note,—"White Caoutchouc."

Assam rubber is the produce of *Ficus elastica*, Roxb. Roxburgh was the first who described this tree and gave its history:—

"Towards the close of 1810," he says, "Mr. Matthew Richard Smith, of Silhet, sent me a vessel, there called a turong, filled with honey in the very state in which it had been brought from the Pundua or Juntipoor mountains, north of Silhet. The vessel was a rather common or rather coarse basket, in the shape of a four-cornered, wide-mouthed bottle, made of split rattans, several species of which grow in abundance amongst the above-mentioned mountains, and contained about two gallons. Mr. Smith observed that the inside of the vessel was smeared over with the juice of a tree which grows on the mountains. I was therefore more anxious to examine the nature of this lining than the quality of the honey. The turong was therefore emptied and washed out, when, to my gratification, I found it very perfectly lined with a thin coat of caoutchouc." (*Roxb. Flor. Ind.* iii. 543.)

Roxburgh also found that older trees seemed to yield a richer juice, which, when exposed to the air, separated spontaneously into an elastic substance or caoutchouc, and a fetid whey-coloured liquid. It is collected by making incisions across the bark to the wood. About 50 ounces of the pure milk taken from the trees in August yielded 15½ ounces of clean washed caoutchouc. After one operation the tree requires a fortnight's rest, when it may be repeated. During the cool season, from October till March, the juice is more scanty than in the warm weather, from March to October, but richer. Assam rubber is shipped from Calcutta in baskets made of split rattans, and weighing about 3 cwt. each. These are generally covered with a jute, gunny bag. This india-rubber has a peculiar mottled appearance, of a bright pinky colour, and very glossy. The baskets consist of either a great number of small "balls" pressed together, or a large irregular mass called "slab." The former is not so much liked, as it offers greater facilities for adulteration than the latter. It is curious to see this and other kinds of hard india-rubber sampled at the London wharves, etc., as, owing to its resistance, it will only allow of being cut with a chopper or knife constantly kept wet with a stream of water. It sometimes takes three or four men some considerable time to cut out a slab about twelve or fourteen inches long. According to Royle, any quantity of rubber can be obtained from India. One great fault, however, clings tenaciously, not only to this, but to all East Indian varieties—that is, its impurities. There is no reason why the caoutchouc of India should not be as pure as fine Para, if proper care were taken. In 1836, while Para rubber was selling at 2*s.* 6*d.* to 3*s.* per lb., East India was only selling at 2*d.*!, and, although there is more care taken now, yet there is great room for improvement. How ignorance may retard the development of a country's resources! In 1828, a zealous collector sent a parcel of rubber from Assam to a large agency in Calcutta, but the consignees, at a loss what to do with it, sent back the following reply, much to the mortification of the collector:—"The article being unknown in the Calcutta market, we are sorry we can give you no idea of its value."

Java india-rubber has a dark glossy appearance, with occasional streaks of a reddish colour. Its price is about 1*s.* 6*d.* to 1*s.* 8*d.* per lb. I do not know what plant it is produced by; Lindley (Flor. Med. p. 298) says, "It is believed that Java caoutchouc is produced exclu-

sively by figs." Miquel (Fl. Ind. Bat., vol. iii.) mentions, *Willughbeia edulis* and *Vahea gummifera* as Java plants.

Penang india-rubber is of a dark colour. Is it the produce of *Cynanchum ovalifolium*, Wight, which is stated by Dr. Wallich as yielding an excellent caoutchouc, and was found by him in Penang? It is a smooth twining plant (Lindl. Fl. Med., p. 542).

Siam india-rubber is of a white or pinky and liver-like appearance. It is very seldom we get any of this kind in England. I do not know by what plant it is produced.

Singapore india-rubber offers us an example of the difficulties to be met with in economic botany. Here is an island, Singapore, of small size, sending enormous quantities of raw goods to Great Britain and other parts of the world, and the question naturally arises, Where are they produced? The trade of Singapore is very great; not only does it form a vast *entrepôt* for the native states around, but also for Calcutta, China, Burmah, Java, Siam, etc. The value of its imports in 1863 amounted to £6,461,720. In Mr. Thomas Hancock's work on the 'History of the India-rubber Manufacture,' the following table is given:—

Imports at Singapore of Caoutchouc for the years 1849–50 *to* 1854–55.

From Java	358,736 lbs.
„ Sumatra	763,280 „
„ China	1,680 „
„ Manilla	14,896 „
„ Borneo	3,024 „
„ Malay Peninsula . . .	448 „
„ Penang and Malacca . .	253,568 „
„ Elsewhere	130,256 „

This table shows how much Singapore depends on the importations for her supplies of india-rubber for export. Very little, if any, of the india-rubber exported from Singapore is native. During the period given in the table above, only 723,968 lbs. of the exports was native Singapore rubber. Since that period nearly all the trees have been destroyed. In a table given in Cameron's 'Malayan India,' £14,110 is stated to have been the value of the india-rubber exported to Great Britain in 1863 from Singapore; it is there stated not to be a native product of the island, but that it is received from neighbouring states, and stored up in the godowns or warehouses. This rubber is received in

baskets, similar to Assam, and has a very bright red-mottled appearance. The price of good Singapore india-rubber is about 1*s*. 6*d*. per lb.

Of the kinds mentioned above, Java, Singapore, and Penang are very much alike in character. They are, together with Assam, of a firm texture, bright polished appearance, and of a mottled colour, ranging often in one sample from very dark brown to a light yellowish-white. Some account for this appearance by saying that it is obtained from several different trees; this is certainly the case with gutta-percha, and a gentleman who has spent ten years in the Straits says, it is what he has always been given to understand.

Roxburgh mentions several other plants producing caoutchouc; among others is the *Willughbeia edulis*, Roxb., found in the forests of Chittagong and Silhet, where it is called Luti-am. It is a large climbing plant, and when wounded discharges copiously a very pure viscid juice, which soon, by exposure to the air, changes into an indifferent caoutchouc. (Roxb. Fl. Ind., vol. ii. p. 57.)

Large quantities of india-rubber are said to exist in China; I have not heard of any direct shipments. If we receive it at all, it is *viâ* Singapore.

III. African kinds of India-rubber.

Mauritius india-rubber is of a white and pinky colour, without the mottled appearance observable in other kinds. It very rarely comes to England. I do not think it is a native india-rubber, but comes from Madagascar, where two species, viz. *Vahea gummifera* and *V. Madagascarensis*, are found.

Dr. C. Meller, in his account of an expedition to Madagascar (read before the Linnean Society, December, 1862), says of the natives, "To procure india-rubber they are less careful, merely making incisions, and allowing the sap to flow into a hole at the root of a tree. They procure their india-rubber from a trailing and climbing plant, whose Order I am unacquainted with. It has thick cordate leaves, pear-shaped and sized fruit; the native name is 'Vauginia.' The *Ficus elastica* is found along the seaboard route, and a *Theophrasta;* but I am not aware that the Malagasy have recourse to them." Miquel (Flor. Ind. Bat., vol. iii.) mentions Madagascar as one of the habitats of *Willughbeia edulis*, Roxb.

African rubber comes over in casks from the west coast of Africa in

slabs, round balls, and "tongues." These last are about four inches long and a little thicker than your thumb. Borneo rubber is bad enough to handle, as regards its smell, but African rubber has a special one of its own. What tales could it tell, if it could use its "tongue," of persons going into a sale-room, thinking perchance of the cholera returns, sniffing and saying, "Dear me, why you've dead rats!" The boards are taken up, but no dead rats or drains are discovered, and so the poor rubber gets the blame, and is finally put out on the roof to air. When old, it turns black and loses much of its fetid smell. It is of a yellowish-white colour, very adhesive and very slightly elastic. It is the poorest of our commercial kinds, its value only being about 11*d.* to 1*s.* 1*d.* per lb. One hundred tons are reported to have been used for home consumption in 1866.

By some this rubber is considered the produce of *Sycomorus Guineensis*, Miq., Hooker's 'Niger Flora,' p. 523. (*Ficus Brassii*, R. Br.) It was first described in "An Account of the Edible Fruits of Sierra Leone," from the Journal, etc., of Mr. Geo. Don, A.L.S., by Joseph Sabine, Esq., F.R.S. (Trans. Hort. Soc. Lond., vol. v. p. 448). However, no mention is made of any caoutchouc being produced by it.

In the Kew Museum there is a specimen of caoutchouc collected by Dr. Kirk in the Livingstone Expedition, from a species of *Carissa*, but it has no resemblance to the commercial kind. The first trace of this rubber I have seen was a specimen of the wood of the tree with the rubber exuding from it, brought from the west coast of Africa by Dr. Horton, and shown to me by Mr. J. R. Jackson at the Kew Museum on October 26th. Subsequently Professor Oliver kindly furnished me with the following note on the subject:—"Dr. Horton brings from West Tropical Africa a specimen of rubber and fragment of plant affording it. This, there can be little doubt, belongs to *Apocynaceæ*, but, being destitute of flowers and fruit, it is impossible finally to determine. It is hairy, and in this character resembles one or two African species of *Strophanthus*." This specimen of rubber is undoubtedly identical with our commercial kind, and we must wait anxiously till proper specimens are forwarded to ascertain the plant producing it.

IV. Australian kinds of India-rubber.

I received to-day (November 14th) a fragment of rubber from Australia, but do not know by what tree it is produced.

List of the plants from which Caoutchouc is principally obtained in quantity.

EUPHORBIACEÆ.
- *Hevea Brasiliensis*, Muell., and other species of the same genus.
- *Micrandra siphonioides*, Bth.
- *M. minor*, Bth.

APOCYNACEÆ.
- *Willughbeia edulis*, Roxb.
- *Couma Guayanensis*, Aub.
- *Hancornia speciosa.*
- *Vahea gummifera.*
- *V. Madagascarensis.*
- *Carissa* sp.
- *Urceola elastica*, Wight.
- *Tabernæmontana utilis*, Arnott.

ASCLEPIADACEÆ.
- *Cynanchum ovalifolium*, Wight.

URTICACEÆ.
- *Ficus elastica*, Roxb.
- *F. Indica.*
- *F. religiosa.*
- *F. integrifolia.*
- *Sycomorus Guineensis*, Miq.
- *Artocarpus integrifolia.*
- *Castilloa elastica.*

There is much to be done yet before the whole matter is elucidated; one way of dealing with it would be by comparing authentic specimens obtained from the plants themselves with our commercial varieties. I should be glad to be favoured with any such specimens, either of india-rubber or gutta-percha.

11, *Arthur Street, Deptford, November*, 1867.

ON THE PLANTS CULTIVATED OR NATURALIZED IN THE VALLEY OF CARACAS, AND THEIR VERNACULAR NAMES.

BY A. ERNST, ESQ.

(*Continued from Vol. V. p.* 275.)

Bromelia Ananas, L. (*Ananassa sativa*, Lindl.)—The Pineapple (Piña) is frequently cultivated in the immediate neighbourhood of the valley of Caracas (Baruta, etc.), so that the fruit may be bought at

Caracas at the rate of threepence or fourpence apiece. It is well known that linguistic reasons point to Brazil as the probable native country of this delicious fruit. Even the name Ana-curua, used by the Indians of the Upper Orinoco, where Humboldt believed to have found the *wild* plant (see 'Travels,' Bohn's edit. ii. 433, and Nouv. Esp. (edit. 1811) iii. 142, note), is nothing but the somewhat changed Guarani name Nana-caraguatá (Ant. Ruiz, 'Tesoro de la Lengua Guaraní,' Madrid, 1639, fol. 233, retro). The plant must have spread over the warmer parts of America long before the arrival of the Spaniards, who found it first in Guadeloupe in 1493. Columbus met with it on his first landing in Northern Veraguas, and Seemann (Bot. Herald, p. 215) contends that it was truly wild in the Isthmus of Panama.

The 'Flora Caracasana' contains three other species of *Bromelia*, which appear to be indigenous,—*B. Karatas*, L. (*Nidularium Karatas*, Lem.), the Curujujul of the inhabitants; *B. Pinguin*, L., or *Maya*, and *B. chrysantha*, Jacq., called Chigüechigüe. The first is the Caraguata-acanga of Piso (teste Rœm. and Schult. vii. 1274), called thus on account of the head-like clusters of the fruits. ('Acanga' in Guarani means *head*, Ant. Ruiz, loc. cit. fol. 12, retro.)

Bunchosia glandulifera, Roth. 'Ciruelo de fraile.'—Uncommon.

Melicocca bijuga, L. 'Mamon,' and *M. olivæformis*, H. B. and K. 'Cotopriz.'—Father Caulin mentions (Hist. Nueva Andal. 15) for the first the Indian (?) name "Muco," for the latter "Cuspiritu."

Hooker and Bentham ('Genera Plantarum,' p. 401) consider the second species as "valde dubia." Having myself examined a considerable number of specimens of both forms, I am convinced that they are not two well-distinguished species. The rhachis of the leaves of *M. bijuga* is by no means always winged,—a fact already mentioned by Jacquin (Amer. 108; "costis compresso-planis, nunc alatis, nunc nudis"). The leaflets are either slightly oblique (principally in leaves with winged rhachis, where the inner half of the leaflets appear commonly somewhat reduced in size) or perfectly symmetrical. The fruit of the Cotopriz is constantly more elliptical than that of the Mamon, the ratio of the two axes in the former being 3 : 5, and in the latter 3 : 4. This is the *only constant* difference I have found; but I think it is certainly not sufficient for establishing a new species. The Cotopriz may, nevertheless, be considered as a distinct variety under the name *Melicocca bijuga* and *olivæformis*.

Spondias lutea, L., 'Jobo,' and *S. purpurea*, L., 'Ciruelo de hueso.' —Both common.

Passiflora quadrangularis, L. 'Parcha' of the Creoles, 'Paicururu' of the Cumanagoto Indians, after Caulin (Hist. Nueva Andal. 14). —Cultivated in many gardens.

Tamarindus Indica, L. 'Tamarindo.'—Rare.

Inga fastuosa, Willd. 'Guamo peludo, *i. e.* hairy Guamo.'—Most frequently cultivated as shade-giving tree in coffee plantations. The broad pod, densely covered with somewhat stinging, short hair, is sometimes two feet long, and generally a little spirally twisted. The edible part is the white floccous arillus, which has a sweetish taste. *Inga vera*, Willd. ('Guamo vejuco') and *I. sapindoides*, Willd. ('Guamo caraota') are much rarer. The fruit of the former is irregularly twisted, and has therefore nearly the appearance of a piece of the stem of a climbing plant, or vejuco: the latter bears pods which resemble those of certain *Phaseoleæ*, 'Caravalia,' several species of which are called Caraota.

F. *Plants cultivated on account of their Seeds.*

Zea Mays, L.—See Journ. of Bot. Vol. V. p. 269.

Cicer arietinum, L.—Cultivated under the name 'Garbanzo,' which Larramendi derives from the Bask Garau (grain) and Antzua (dry). (Diez, Wörterb. ii. 131.) Even the Greek name, ἐρέβινθος, does not appear to be very different.

Pisum sativum, L., var. *saccharatum*. 'Alverja,' from *ervum* or *ervilia*.—Very common.

Phaseolus Dolichos.—A great many kinds are cultivated, but I have, as yet, not been able to reduce all of them to scientifically-established species or varieties. The common name 'Caraota' (accent on the second *a*) is derived from the Greek κεράτιον, seeds of various leguminous plants, which formerly were used as weights. Another variety is called 'Frijoles,' formerly 'Frisoles' or 'Frisuelos,' probably from 'Fresa.' "Defresum, *detritum*, unde adhuc fresa faba, quæ obtrita frangitur, Gloss. Placid. faba fresa dicta, quod eam frendant, *i. e.* fragant, Papias." (Diez, Wörterb. ii. 129.) Three other varieties have names of American origin,—'Tapiramo,' 'Guaricamo,' and 'Apirucuso.'

Cajanus Indicus, Spr. 'Quinchoncho,' probably from 'Catjang,' the

native name of the plant in the East Indies.—The Pea-tree is now little cultivated. ('Quinchoncho de monte' = *Crotalaria anagyroides*, Kth., is common.)

Arachis hypogæa, L.—Seldom cultivated. The vernacular name, 'Maní,' is Haytian, and not very different from the Brazilian 'Mandubi,' said to be formed of 'Ma,' handful, and 'Ubi,' to be. (Ant. Ruiz, Tesoro, fol. 206, recto.) Markham (Quich. Gram. and Dict. 190) explains the word 'Ynchic' as an *edible root*, quoting Garcilaso de la Vega; but that authority identifies plainly the 'Inchic' and the 'Maní.' (Garcilaso de la Vega, Coment. reales, Madrid, 1723, p. 278.) H. Barth. ('Reisen und Entdeckungen in Africa,' abridged edition, i. 420, 421) gives some interesting notes on the names and use of our plant in Africa.

Sesamum Indicum, L. 'Ajonjoli.'—Rare in the valley of Caracas, but frequently cultivated in the neighbourhood of Maracaibo. The vernacular name has long been an enigma to me. It appears to be identical with the Sicilian 'Guiggiolena' (Hogg, Classical Plants of Sicily in Hooker's Journ. of Bot. 1834, p. 135), and with the French 'Jugéoline' for *Sesamum Brasiliense*. (Treasury of Bot. ii. 639.) Diez (Wörterb. i. 216) refers the Italian 'Giuggiola' (the Jujube-tree) to *Zizyphus*. This word is, therefore, also the root of the Spanish 'Ajonjoli.'

Theobroma Cacao, L. 'Cacao.'—Venezuela exported from July 1, 1864, to July 1, 1865, nearly four million pounds of Cacao, principally to Spain.

Abelmoschus moschatus, Mch. 'Argalia.'—Rare.

A. esculentus, W. A. 'Quimbombó.'—Alph. De Candolle (Geogr. Bot. ii. 768) declares in favour of the American origin of this plant, and considers the African derivation of the names 'Quillobo,' 'Quingombo,' 'Quimbombó' not proved. We have now so many students of African philology, that I should think the question might be very easily settled. On the western coast of Africa there are several local names, which show a striking resemblance to that of our plant,—'Quicombo,' a Portuguese settlement on the coast of Benguela, 'Kilongo,' on the coast of Loango, etc. Even the name 'Okoro,' or 'Okra,' appears to be African. H. Barth. ('Reisen,' abridged edition, i. 481) states that in Bornu the plant is cultivated under the name 'Karáss.' Bornu slaves were frequently carried over

to Brazil, and may have brought the plant, as well as its name, to this country, where, after addition of the Portuguese masculine article *o*, the name assumed the shape 'Okaráss' or 'Okra.' There is only *one* positive statement in favour of the American origin of the plant, viz. that of C. Jacquin; "crescit sponte in Caribæis." But this loses much of its value by not being corroborated by any of the numerous botanists who explored the West Indian Islands.

Gossypium. 'Algodon.'—The *G. Barbadense*, L., and *G. hirsutum*, L., are probably both of American origin (see Parlatore, 'Le Specie dei Cotoni,' Firenze, 1866, pp. 17, 18); and the former is common in the valley of Caracas, though nowhere with the features of a truly wild plant. (Venezuela exported from July, 1864, to July, 1865, more than 5,300,000 lbs. of cotton.)*

Coffea Arabica, L. 'Café.'—The Coffee-tree was brought to Venezuela, in 1730, from Trinidad or Martinique. In 1740 there were some small plantations, but the seeds were used more medicinally than as an article of daily food. In 1783, José A. Mohedano, the priest of the small village of Chacao, near Caracas, planted 6000 trees, and soon afterwards established Bartolomeo Blandin (the same mentioned in Humboldt's 'Travels') the first large coffee-plantation between Caracas and Chacao. (Venezuela exported from July, 1864, to July, 1865, 28,420,442 lbs. coffee, principally to Hamburg.)

Cocos nucifera, L. 'Coco.'—The few specimens cultivated in the valley of Caracas, with exception of a single one, do not produce fruit The Palm is abundant on the shores of Lake Valencia.

G. *Plants cultivated for Ornamental Purposes.*

The following list contains all those plants which nearly everywhere may be seen in large gardens, as well as about the dwelling-places of the poor.

Cicca disticha, L. 'Cerezo.'

Jatropha multifida, L. 'Emético vejetal, Ipecacuana.'

Aleurites triloba, Forst. 'Nuez de China.'

Ricinus communis, L. 'Tártago,' corrupted from 'Tartarus,' on account of its purging properties.

Euphorbia pulcherrima, Willd. 'Papagayo.'

* I cultivate now in Los Dos Caminos, five miles east of Caracas, twenty-three different kinds of Cotton, from seeds which Dr. J. D. Hooker kindly procured for me from Major Trevor Clarke, F.H.S. All the seeds came up well, and the whole plantation is in the most flourishing condition.

Amarantus paniculatus, L., *β. cruentus*. 'Pira morada.'

Althæa rosea, Cav. 'Malva real.'

Abutilon striatum, Dicks. 'Campanilla.'

Hibiscus Rosa-Sinensis, L. 'Cayena.'

Sapindus Saponaria, L. 'Parapara.'—I *never* saw this tree wild in the valley of Caracas, though it may be indigenous in other parts of Venezuela.

Melia sempervirens, L. 'Alelí.'

Swietenia Mahagoni, L. 'Caoba.'—Has lately been planted in the Plaza Bolivar of Caracas.

Murraya exotica, L. 'Azahar de la India.'

Clitoria Ternatea, L.

Parkinsonia aculeata, L. 'Cují de afuera,' *i. e.* 'Foreign Cují;' 'Cují' being a general name of many *Mimosæ* and *Acaciæ*.

Cæsalpina pulcherrima, Sw. 'Clavelina.'

Cassia grandis, L. (*C. Brasiliana*, Lam.) 'Cañafístola macho.'

Adenanthera pavonina, L. 'Peonía.'

Rubus rosæfolius, Sm., fl. pleno. 'Rosita blanca.'

Rosa.—A great many forms are cultivated under different garden names.

Lawsonia inermis, L. 'Réseda.'—On account of its sweet smell.

Lagerstrœmia Indica, L. 'Alstromelia,' corrupted from the generic name.—This beautiful plant was introduced by Count Tovar, who obtained it from Porto Rico. It is now very common.

Sechium edule, Sw. 'Chayota.'—Cultivated also for its edible fruits.

Umbellifera. 'Perla fina.'

Plumbago cærulea, K. 'Guapote azul.'—*P. scandens*, L., is indigenous and common. The name 'Guapote' is derived from the Chayma word 'Apoto,' fire, on account of the blistering properties of the leaves.

Dahlia coccinea, Cav. 'Dalia.'

Jasminum officinale, L. 'Jasmin.'

J. Sambac, Ait. 'Jasmin de Arabia.'

Allamanda cathartica, L. 'Jasmin amarillo.'

Thevetia neriifolia, Juss. 'Retama.'

Vinca rosea, L. 'Monigote.'

Gomphocarpus fruticosus, R. Br.

Calotropis procera, R. Br. 'Algodon de seda.'

Hoya carnosa, R. Br. 'Flor de cera.'

Russelia juncea, Zucc. 'Lágrimas de Cristo.'

Datura suaveolens, H. Br. 'Flor de Luna; ñongué oloroso.'

Cestrum leucocarpum, Dun. 'Dama de noche.'

Crescentia Cujete, L. 'Tortumo,' a Chaymas word.—There are two pretty constant forms; one with completely spherical fruits [Gardner's *C. cuneifolia*.—Ed.], and another with ellipsoidal fruits. This tree is nowhere wild in the valley of Caracas, whilst its congener, *C. cucurbitina*, grows frequently wild in the ravines of the mountains close to streamlets.

Tecomaria Capensis, Seem.
Ipomœa Quamoclit, L. 'Flor de Guillermo.'
Ocimum Basilicum, L. 'Albahaca.'
Coleus amboinicus, Lour.—Near Laguaira, almost naturalized.
Salvia splendens, Sell. 'Guiriri.'
Verbena chamædrifolia, Juss. 'Virginia.'
Clerodendron fragrans, W. 'Mil flores.'
Cupressus fastigiata, L. 'Cipreso.'
Thuya occidentalis et *orientalis*, L. 'Pino.'
Oreodoxa regia, Kth. 'Chaguarama.'
Phalaris arundinacea, var. *picta*, L.
Andropogon citratum, DC. 'Malojillo.'
Yucca aloifolia, L. 'Bayoneta.'
Polanthes tuberosa, L.—The simple-flowered form is called 'Narciso,' the double 'Nardo.'
Alpinia nutans, Rosc. 'Flor del Paraiso.'

BUPLEURUM ARISTATUM.

It is stated in the Journal of Botany (Vol. V. p. 360) that *B. aristatum* is "only reported from Devon." In the 5th and 6th editions of my Manual, I have recorded its discovery at Eastbourne, in Sussex, by my friend the Rev. E. A. Holmes, F.L.S. He only found a few very small specimens hiding themselves in the turf of the Downs at that place, and supplied my herbarium with some of them. Thus the plant is shown to occur elsewhere than at Torquay, and may be expected to be found on other parts of our south coast, if looked for with sufficient care.

C. C. Babington.

CORRESPONDENCE.

A New British Fungus.

It will, no doubt, be interesting to many to know that during a short excursion in Scotland, in August, 1866, I discovered *Dothidea Pteridis*,—a fungus, I believe, hitherto unrecorded in Britain. I found it at Targoyle, a few miles from Inverness-shire. Any one wishing for specimens may have them by writing to me. [Previously recorded as British by Mr. Cooke, in his recently-published 'Fern Book for Everybody.'—Ed.]

T. W. Gissing.

Wakefield, December 16, 1867.

NEW PUBLICATIONS.

The Darwinian Theory of the Transmutation of Species, examined by a Graduate of the University of Cambridge. London: Nisbet and Co. 1867. Pp. 386. 8vo.

It is not the practice of this journal to deal much with speculative subjects. There is plenty to do in the much more important work of simple observation of nature, and its interpretation by legitimate induction. This may not be so attractive, but it is more valuable, and enduring. The imagination is a fruitful source of error in science, but its free use gives its employer a popular power which it is difficult otherwise to gain. The reading public, and the lecture-hearing public run after novelties, and wherever a bold theory is presented there will always be found gaping crowds to swallow it;—the theory may have no foundation or support in fact, but that is little matter. There is nothing so wild, nothing so absurd, but will find supporters in this strange world of ours. A plain narrative of the various hypothetical dreams in science which have been seriously propounded and strenuously defended since the restoration of learning, would be a curious, an almost incredible story. The latest phase of those dreams is that connected with the origin of the different forms of life which have existed and now exist on the globe; and in this country the most popular of them is that proposed by Darwin, illustrated by his numerous disciples, and now carried a stage further by the physicists, who, attaching their materialistic notions to the views of the author of the hypothesis, have carried it much further than he would, we believe, be prepared to follow.

The voluminous writings in expositiou or defence of Darwinian views, are filled with plausibilities about everything, which to their authors appear to bear on the subject; but we affirm, and we carefully estimate the value of our words as we write them, that there has not in them all been adduced *one fact* which supports the notion that a single species has originated from another by natural selection or by any other cause. To argue that evidence does exist which has not yet been brought to light, or did exist but has been lost, is too absurd to be entertained for a moment as the basis of a theory claiming to be scientific; and yet this is all, in few words, that has been said for the

popular idea of the origin of *species.* It is a playing with terms, and a sophistical abuse of logic to transfer the argument derived from *changes* occurring accidentally or produced by design in the *varieties* of a species, to the imagined *transmutation* of one *species* into another. No argument based upon such confusion is of the slightest scientific value.

We are, however, going beyond our purpose, in criticizing independently this hypothesis. Our intention was to say a word or two on the "examination" of it before us.

The author of this volume deals with the position taken up in the 'Origin of Species,' in two ways:—first, as an argument, and then as an exposition of natural phenomena. It is seldom that the logical and the observational faculties occur equally powerful in the same individual. When they do, their possessor stands out as a founder or restorer of science, as in the case of Robert Brown. Generally, we find the one overpowering or dwarfing the other. And no better examples of this could be adduced than the Author and "Examiner" of the Darwinian theory. Darwin is a close, a keen, an unsurpassed observer of nature, but his defects are at once apparent when he begins to argue; in his premises he confounds things which differ, and draws conclusions not covered by his data. His "Examiner," on the other hand, is at home with premises, syllogisms, and conclusions; he can estimate the value of an argument, and detect its fallacies; but when he steps beyond this and deals with scientific facts, he at once shows his defects. Had he confined his examination to the logical aspect of Darwin's position, his book would have been a success. His early chapters contain a complete and withering exposition of the logical fallacies which everywhere abound in the 'Origin of Species.'

Unfortunately the author has disfigured his pages by the introduction of a weak and often obscure sarcasm. He has taken as his model that remarkable article of Sedgwick's, which appeared in the 'Edinburgh Review' some twenty years ago, and which gave the deathblow to the "Vestiges." Had he been able to wield the weapon as powerfully as his master, it would have added force to his position; but Sedgwick's sarcasm is natural, obvious, and concise, while that in this work has the opposite defects. Whatever advantage there may be in gaining the public ear, is more than lost in a scientific argument

by the unfitness of forced sarcasm. And it must also be remembered that while the public may be amused they will not be convinced by such writing.

The defects, too, in scientific knowledge are unpardonable in such a work. They especially abound in the chapter on "The Geological Question." If the author would eliminate the sarcasm and the science, and treat the subject as a logician, his book would be of great value. It could not be set aside by Darwinians, as it will certainly in its present form, and it would take away the occasion, too good not to be eagerly seized by 'small' reviewers, to show off their knowledge, by pointing out the errors, and so give them the power of ignoring the author's powerful and conclusive arguments, or burying them under the cloud of trivial ridicule that they will certainly heap on the work.

Even in its present shape it should prove of service, as we hope it may, in bringing men who have been letting their imaginations run wild back to their senses, and inducing them again to undertake the quieter and better work of interpreting nature by the observation of facts.

British Sea-Weeds: an Introduction to the Study of the Marine Algæ of Great Britain, Ireland, and the Channel Islands. By Samuel Octavus Gray. London: Reeve and Co. 1867. Pp. 312; Pl. 16. 8vo.

It has been our duty more than once to expose, in these pages, the worthless compilations that are sometimes issued by enterprising publishers as introductions to popular botanical studies. It is a pleasure to find a popular manual, original and accurate as well as popular. Such a pleasure awaits every one who has to consult this unpretending little manual. Mr. Gray has mastered his subject, and in clear, precise, and elegant language describes every genus and species of British sea-weeds. He is evidently familiar with every form, and his characters, instead of being transcriptions or paraphrases of those of former writers, are original and life-like sketches of the objects of his favourite pursuit. We strongly recommend it to all who are interested in this much-admired family of plants. Its price and its size, as well as the characters which we have noticed, will make it the seaside companion of all algological students. We would suggest to the author in preparing a second edition, which we have little doubt will soon be

called for, to introduce the names of the authors of the species into the body of the work as well as in the systematic list; and the addition of short diagnostic characters of the tribes, sections, and genera to this list, so as to make it a key to the work. The only change in nomenclature we have noticed is one that will meet with general approval. *Delesseria sanguinea*, the most striking of our British *Algæ*, was some years ago separated from that genus, and condemned to appear under the name *Wormskioldia*. This had, however, been already appropriated to a genus of flowering plants, and Mr. Gray has substituted for it the more agreeable and euphonious name *Maugeria*.

BOTANICAL NEWS.

Mr. W. Thistleton Dyer, B.A., has been appointed Professor of Botany in the Royal Agricultural College, Cirencester.

Drs. Regel and Herder have sent us their 'Enumeratio Plantarum in regionibus cis- et transsiliensibus a cl. Semenovio anno 1857 collectarum,' 8vo, pp. 159, with two plates, a reprint from the Proceedings of the Moscow Academy. The two plates accompanying it represent *Semenovia Transiliensis* (a new genus of *Umbelliferæ*, omitted by Hooker and Bentham in their 'Genera'), *Acanthophyllum paniculatum*, *Acer Semenowii*, and *Cicer Songaricum*, var. *imparipinnatum*.

A fearful cyclone swept over the Botanic Garden of Calcutta, on the 2nd of November last, destroying many of the plants which had escaped destruction by that of 1864, and many of the species which since that gale had been introduced.

Germany has lost another of her great botanists in the person of Dr. C. H. Schultz (Bipontinus), who died at Deidesheim, on the 17th of December last, in the sixty-third year of his age.

We regret to have to announce the death of Dr. Charles Giles Bridle Daubeny, Professor of Chemistry, Botany, and Rural Economy, and Curator of the Botanic Garden at Oxford. He was born in 1795, at Stretton, in Gloucestershire, and educated at Magdalen College, Oxford, where he graduated B.A. in 1814, and subsequently proceeded to his other degrees. Having applied himself to the study of medicine, he practised for some years as a physician, but since 1829, applied himself to the physical sciences, especially chemistry and botany. He took an active part in the proceedings of the British Association, and similar meetings, and wrote several botanical works, among which may be named his 'Lectures on Roman Agriculture,' 'Lectures on Climate,' and an 'Essay on the Trees and Shrubs of the Ancients.' The last-mentioned work, which appeared in 1865, shows, however, that the author was not conversant with the actual state of modern systematic botany. He died on the 13th of December; and will be chiefly remembered by his efforts to free Oxford University from the stigma of neglecting the cultivation of the natural sciences.

Tab. 75.

Worthington, G. Smith, Del. et Lith.   P. Waller, Imp. 18 Hatton Garden.

NEW OR RARE HYMENOMYCETOUS FUNGI OF THE BRITISH FLORA.

By Worthington G. Smith, Esq.

(Plates LXXV. and LXXVI.)

During the last six or seven years our British cryptogamic flora has been enriched by an addition of upwards of a hundred and fifty species of Hymenomycetous Fungi (the hymenomycetes forming only a fourth part of the whole Order). Most of them are attractive objects in consideration of their size, form, and colour, and the reason of their having lain so long unrecognized is undoubtedly owing to the small number of botanists in this country who make the subject of Fungi their special study. This is not a little singular when we consider the abundance of handsome species which annually crop up in our pastures and woodlands,—at a time, too, well suited for botanizing, and when most people take their autumnal holiday.

A considerable number of these hundred and fifty species have proved to be quite new to science and were previously undescribed, whilst others have been recorded for the first time as natives of this country. The following paper records a few new and rare species which have not been published elsewhere, with some remarks on the *recurrence* of other rare species which *have* been observed before.

Boletus rubinus, n. sp. (Tab. LXXV., Figs. 1–4). *Pileus* yellow-brown, gibbous, pulvinate, then plane, dry, subtomentose, slightly cracked; *tubes* wholly carmine, subdecurrent, compound, of a medium size; *stem* yellow, smeared with crimson, irregular; *flesh* vivid yellow, perfectly unchangeable; *spores* pale umber, ovate, length ·00025 in.

I have but once found this species; at the time of finding (12th September, 1866) it was plentiful, by a grassy roadside under trees, Caddington Lane, near Dunstable, Bedfordshire. It clearly belongs to Group II., *Subtomentosi*, of Fries, and its place is after *B. parasiticus*, Bull., its nearest ally, from which, however, it differs in many respects, a remarkable distinction being apparent in the spores; those of one being exactly twice the length of the other. (See Plate LXXV., Fig. 4, spores of *B. rubinus;* Fig. 8, spores of *B. parasiticus*, × 700 diam.)

Boletus fragrans, Vitt. Esculent. This handsome species, which

appears to have been quite overlooked by English botanists, I have found several times. The first place in which I gathered it was Gamston Wood, near Retford, Nottinghamshire, on July 20th, 1865; it was most abundant, and grew principally under oaks. During the same autumn, and also on September 15th, 1866, I found it sparingly under oaks in Bishop's Wood, Hampstead; and on October 10th, 1867, I had three specimens of the same species sent on to me from Devonshire; it therefore appears to be widely spread. When I first found it (having no botanical books with me) I imagined it to be a variety of either *B. edulis*, Bull., or *B. subtomentosus*, L., for either of which it might, at a first glance, be mistaken; its neat and wholesome aspect and delicious and enticing fragrance invited me to cook it. I found its taste delicate, sweet, and delicious. It often grows in large confluent bundles, unlike any other British *Boletus*. The *pileus* is bronze-brown, pulvinate, and scabrous, the *tubes* minute and of a beautiful shade of subdued yellow-green; the *stem*, which is thickened downwards, is brown and also scabrous, and the *flesh* is pure white, which changes here and there to the slightest imaginable shade of cobalt on being cut or broken; the *spores* are yellowish-green, ovate, with an apiculus at one end, having a length of ·00045 in. and a breadth of ·00017 in. There is a long and exhaustive account of this species, with some excellent figures, in Vittadini's 'Fungi Mangerecci,' p. 153, t. 19, Milan, 1835. Krombholz also figures and describes it under the name of *B. xanthophorus*, in his 'Naturgetreue Abbildungen,' t. 75. f. 15–21, Prague, 1831 and 1846, but the figures in the latter work are not well done. Fries refers *B. æneus* of Secretan to the same species.

Polyporus epileucus, Fr. Whilst out walking on Sunday, November 17, 1867, I found a very large specimen of this species, which has not been previously recorded as British, growing on the trunk of an old Elm-tree (about ten feet from the ground) near the Sluice House, Holloway. It is a very large and handsome species, stemless, of a rich but subdued yellow colour, and somewhat corky consistence; the tubes are very minute and about three-quarters of an inch long; the pileus is tough, shaggy, and dingy white. It is figured in Fl. Dan., t. 1794, under the name of *P. spumeus*.

Passing over for the present several other *bonâ fide* additions to our

hymenomycetous Fungi, the following list of the recurrence of several very rare species possesses considerable interest:—

Agaricus (Volvaria) Loveianus, Berk. W. G. Smith, in Seemann's 'Journal of Botany,' December, 1867.

Agaricus (Pholiota) capistratus, Cooke. Esculent. Described in Seemann's 'Journal of Botany,' March, 1863; since which time nothing had been seen or heard of it till Mr. J. Aubrey Clark sent me three fine specimens from Street, Somerset, on the 25th of November, 1867. They were found growing at the foot of an Elm, in company with *A. pudicus*, Bull. The spores in both species are precisely the same in size and colour.

Agaricus (Flammula) carbonarius, Fr. (Tab. LXXV., Figs. 5–8). Recorded as British by the Rev. M. J. Berkeley in August, 1866. It was first observed by him at Ascot, November 22, 1865. Perhaps the reason this remarkable species was for so long a time overlooked rested on its very late appearance in the autumn. I never saw it till last year. At the end of November and beginning of December, and that too after severe frost, it swarmed in immense quantities in Epping Forest. It grew upon charcoal and burnt earth, on the scorched circles left by the gipsies, so that it was impossible to gather the plants without bringing away part of the charcoal attached to them, as shown in the figures on Plate LXXV., which were drawn from specimens I gathered there.

Agaricus (Hypholoma) capnoides, Fr. We generally get this species on the stumps of Firs at North London; it is a common species about Hampstead, and common in the neighbourhood of Epping Forest.

Lactarius acris, Fr. Always comes up in Epping Forest; gills distant, pileus almost black: extremely acrid and bitter.

Russula fœtens, Fr. Common in the neighbourhood of London, generally rancid and stinking, but at times fragrant. It is not uncommon to find it as sweet-smelling as *Agaricus (Clitocybe) odorus*, Bull.

Boletus cyanescens, Bull. In company with my friend Mr. F. C. Penrose, architect, I found this species in some abundance under Oaks near the north gate of Richmond Park, on September 17, 1867. A friend of mine also found it at Bishops Stortford, Herts; the tubes are very pale lemon-colour, and the spores, when seen in the mass, partake of the colour of the tubes; they are spindle-shaped, and measure

·0006 in. in length and are not truly colourless. This species has now been found in Oxfordshire, Norfolk, Hertfordshire, Surrey, and Devonshire (and is recorded by Abbot from Bedfordshire).

Polyporus intybaceus, Fr. This species comes up in abundance every year on old Oaks near Teignmouth, Devon, often attaining an immense size.

Hydnum tomentosum, L. (Tab. LXXVI.). The drawing on Plate LXXVI. was taken from a plant gathered in the Ascot fir-woods. It was first found a year or two ago by the Rev. G. H. Sawyer; it is of rare occurrence, and does not appear to have been noticed elsewhere than at Ascot in this country; it grows amongst decaying fir-needles and is sweet-scented; spores very minute, white, and papillated.

Hydnum coralloides, Scop. This has occurred two years in succession at the top of a very old Ash-tree, on the lawn in front of Bohun Lodge, East Barnet; both in form and colour it resembles a Cauliflower. I was allowed to gather this year's plant for my series of drawings of the Hymenomycetes. I had part of it cut into thin slices and cooked for supper, as it is said to be edible.

Clavaria Ardenia, Sow., was found in December, 1866, by Miss Lott, under Laurels, in the grounds of Barton Hall, South Devon. The Clavarias were very large and parasitic on dead Fir leaves.

Explanation of Plates.

Plate LXXV.—Fig. 1, 2, and 3, *Boletus rubinus*, n. sp. Fig. 4, spores × 700 diam. Fig. 5, 6, *Agaricus (Flammula) carbonarius*, Fr. Fig. 7, spores × 700 diam. Fig. 8, spore further enlarged. Fig. 9, spores of *Boletus parasiticus*, Bull, × 700 diam.

Plate LXXVI. (to be issued in the March number of this Journal).—Fig. 1, 2, 4, *Hydnum tomentosum*, L. Fig. 3, spores × 700 diam. Fig. 5, section.

ON VARIATION OF COLOUR IN THE FLOWERS OF THE WARRATAH (*TELOPEA SPECIOSISSIMA*), AND SEVERAL OTHER INDIGENOUS PLANTS OF NEW SOUTH WALES.

By George Bennett, M.D., F.L.S.

By the kindness of Colonel Lock, of H.M. 50th Regiment, I received, in September, 1867, a delicate and beautiful variety of the Warratah, or

native Tulip (*Telopea speciosissima*, var. *alba*), which he gathered on the Currajong range, near Richmond, New South Wales. The inner bracts surrounding the base of the flower-head are white, the points having a narrow edging of crimson, whilst the outer are of a reddish-brown. The expanded flowers are of a delicate pure white, with the footstalks of a pale yellowish-green; the unexpanded flowers are towards the centre tipped with a pale yellowish-green, similar to that of the footstalks, which form an agreeable contrast to the pure white of the open flowers, but this is lost as the flower becomes expanded. The anthers are yellow, and appear to be fertile. This was the only flower found on the tree, and is a very fine grown one, measuring full six inches across. The foliage of this variety is similar in colour (a dull olive-green), but smoother and less serrated at the edges than that of the crimson flowering plant. A number of Warratahs, being a profusion of very fine flowers (for the flowers of the Warratah, as well as those of the *Doryanthes excelsa*, or Gigantic Lily, have been unusually abundant and magnificent in size and colour this season) of the normal brilliant and rich crimson colour, were growing about the same locality, but this was the only white variety observed. It would be interesting to procure the plant that produced this pretty variety, and by propagating from its roots or suckers ascertain if it could be perpetuated. An accurate and artistic drawing of this plant was obligingly made for me by Mrs. Meredith, of Tasmania, the distinguished author of the 'Bush Flowers of Tasmania,' and other works, and also by Miss Oliver, of Sydney.

I had mentioned in a former paper ('Journal of Botany,' 1867, p. 140) that the best time to transplant the Warratah was when in flower, and when the flowering shoots described in the same paper are observed to arise from the base of one of the flowers; this obtains also with most of the Australian plants, as they generally root and thrive well when removed at that time.

I have observed a deviation, principally from the normal colour, in the flowers of other plants growing in the vicinity of Sydney, New South Wales, as well as in the Warratah; for instance, on Mr. Holt's estate at Cook's River, I found a variety of *Epacris grandiflora*, bearing a profusion of white flowers, the other shrubs of the same species growing with them, having the usual scarlet ones. In October, 1866, I had an opportunity of examining some recently-gathered

specimens of the *Boronia serrulata*, or native Rose, from the north shore, Port Jackson, the flowers of which, instead of having the normal rose-magenta colour, were of a pure white, a few having a very faint tinge of pink. A few days since, I had given to me a bunch of another beautiful species of *Boronia* (*B. pinnata*), growing to more than two feet high, and bearing a profusion of very fine and unusually large blossoms, some of a pure white, and others tinted with a very delicate shade of pink, the normal colour being a deep pink. These were gathered in the vicinity of Middle Harbour, Port Jackson. In the month of November, 1866, a "Blueberry-tree" (*Elæocarpus cyaneus*), growing on the grounds at Claremont, Rose Bay, near Sydney, the residence of my friend George Thorne, Esq., produced flowers of a beautiful pink colour, instead of the usually delicate white. It would be interesting to observe whether a similar change takes place in the same tree the following year; if so, it may be considered an established variety. There is also a pink variety of more than one species of *Eucalyptus*, or Gum-tree, found in the interior of New South Wales, the normal colour of the flowers being white. Mr. James Norton, of Ecclesbourne, near Sydney, brought me a white variety of *Sowerbæa juncea*, the usual colour being purplish, varying when fading to a reddish tinge. This gentleman, who has devoted some attention to the variation of the native plants in their wild state, gave me the following list of those which he has found white-flowering varieties or albinos :—

Thysanotus juncea (Fringed Violet).
Tetratheca juncea.
Indigofera australis.
Kennedya monophylla.
Bauera rubioïdes.
Eriostemon salicifolium, and
Sprengelia incarnata.

Sydney, New South Wales, November, 1867.

ON THE CONSERVATION OF FORESTS IN NEW ZEALAND.

By W. Lauder Lindsay, M.D., F.R.S. Edin., F.L.S.

(*Read before the British Association*, 1867.)

While travelling in New Zealand in 1861–2, I was much impressed with the following facts or convictions :—

I. That its present forest area is extremely small in relation to what

it evidently was in times comparatively recent,—so recent apparently that both man and the Moa inhabited the country, which was, with limited and local exceptions, generally and richly forest-clad.

II. That the remnants of the primitive forest still existing are rapidly disappearing under the following combination of destructive agencies:—

1. *Natural.*
  A. Current geological changes.
    1. Oscillations in the level of the land: especially its local subsidence.
    2. Encroachment by sea-sand on the coasts.
    3. Erosion of coasts by the sea; of the margins of lakes; of the banks of rivers and streams, especially during storms and floods of winter.
  B. Avalanches; glaciers; windstorms; lightning; winter torrents and floods.
  C. Wild animals (birds, insects, etc.) eating bark; tearing up saplings; devouring seeds or seedlings; burrowing under the bark or within the timber.

2. *Artificial.*
  A. *Indirect or accidental.*
    1. Cattle and wild pigs.
    2. Bush fires.
  B. *Direct or deliberate.*
    1. Bush-clearing for agricultural purposes.
    2. Timber-cutting for building.
       „ „ fencing.
       „ „ fuel.
    3. Track-making for man or cattle.

III. That this destruction, which is more or less necessary or inevitable, is materially hastened by the reckless and improvident, or illegal and culpable timber-felling, both of colonists and natives: more especially as regards the former, by—

1. The abuse of the wood-cutting licence.

And as regards the latter—

2. Deliberate destruction in connection with their superstitions.

IV. That with this improvident and unnecessary destruction co-

existed a great scarcity of timber, both for fuel and building, in many parts of the colony, rendering expensive *imports* indispensable.

V. That no adequate legal check, or provision, exists for the prevention of such abuses, and the protection of the forest interests.

VI. That there apparently exists, on the part both of colonial governments and colonists, a blind indifference to, or ignorance of, the importance of—

1. Preserving to the utmost the old or primitive forests; and of—
2. Forestalling their inevitable disappearance, or replacing them, by the *systematic cultivation of new forests*, whether of—
   - A. Indigenous or—
   - B. Exotic (acclimatized) trees.

VII. That many important problems await solution; affecting both—

1. The economic value and applications of the existing timber-trees, and—
2. The rearing of the new forests.

   Which scientific experts or systematic experiment alone are probably capable satisfactorily of solving. *E.g.*

   - i. A. Best seasons for felling timber.
     - B. Comparative durability in salt- and fresh water.
     - C. Power of resistance to marine-boring animals.
   - ii. Determination of the species, indigenous or exotic, most suitable for the various purposes of building-timber, shelter, fuel, etc. *E.g.* as respects—
     - A. Rapidity of growth,
     - B. Facility of acclimatization,
     - C. And ultimate or permanent economical qualities.

VIII. That there seems an evident and clamant want of a *Board of Forests* in New Zealand, with a complete and skilled staff suited to the requirements of so large and so varied a colony; and that a similar want exists in all our colonies, which are similarly placed.

A conviction that the double subject of the—

1. Improvement and preservation of primitive forests, and the—
2. Systematic rearing of new forests, by way of substitution or replacement, as and before the old ones disappear,—

is one of essential importance to the welfare of a young colony—and,

indeed of all our colonies, old or young (for not even in India do I think the Forest Conservation arrangements yet nearly so complete as they ought to be)—has led me to offer to this Association the result of my observations and inquiries in New Zealand. These observations and inquiries were principally conducted in the province of Otago, during a three or four months' residence in 1861–2; and, where not otherwise specified, my remarks are to be understood as referring to that province and that date. But subsequent or prior observation in Australia and various countries or islands of Europe, and a study of the literature of the subject, lead me to believe that my remarks will be found to apply *mutatis mutandis* to all our forest-clad colonies in at least the earlier stages of their settlement.

However interesting in themselves the subject of the agencies of destruction of the New Zealand forests, or the other subjects tabulated in the preamble to this communication, their due consideration here would occupy too much time: and I propose, therefore, confining my present remarks to an illustration of those causes of destruction of the old, and those other circumstances connected either with the old or new, forests of that colony, which seem to bear more especially on the *necessity for the establishment of a Government Board of Forests.*

1. *The "Bush-Licence" and its abuse.*—In Otago I met with many startling instances of sacrifice to a blind and ignorant utilitarianism; but illustrations were equally abundant of indiscriminate and extravagant destruction of valuable timber, arising from a loose colonial morality and an evasion of the written law, which were unfortunately tolerated and too general, because there was no active or practical check or restraint imposed by Government on practices in all respects reprehensible. Where a settler *purchases* bush-land, he has, of course, though unfortunately perhaps, a right to do with it what pleases him, whether this be or not for the ultimate advantage of himself or the colony. But in the eastern districts, at least at the period of my visit, the most of the "bush" (or primitive forests), which there exists for the most part in extremely limited patches, was "reserved" by Government. Government, however, in these its so-called "bush-reserves," granted to individual settlers a "bush-licence" for *firewood* or *fencing*, as the case might be; the annual cost of the former being 20*s*., and of the latter, 50*s*. For this paltry sum (as I understood) the licensee is entitled to cut as much timber as he requires, for his individual use, for

firewood or fencing; and he would apparently act quite legally—quite within the terms of his licence—were he to damage, to any unlimited extent, the forest over which he has thus acquired a wood-cutting right. Practically, however, the settler cuts what he chooses: in some cases he pays no fee, takes out no licence, but helps himself to what timber he requires, whether for building, fencing, or firewood. Others are not honourable or conscientious enough to pay the higher fee when the lower one enables them—there being no Government inspector, of any grade, to prevent them—to cut for fencing as well as firewood. Comparatively few indeed were those who paid the proper fee, and acted honourably in accordance with the spirit as well as letter of their licence. The only practical safeguard against indiscriminate destruction of the bush-reserves lay in their small number, isolated character, and distance necessarily from the residences of many of the settlers. Where no roads exist, and draying over hills and through swamps is a matter both of serious difficulty and expense, there is little danger of a settler's cupidity or thoughtlessness leading him to cut more timber than he absolutely requires; though this affords no restraint upon his cutting timber to which he has no right, legal or moral.

While the condition of forests in New Zealand illustrates certain serious *errors of omission* in its Government, that of some of the neighbouring Australian colonies illustrates Government *errors of commission*. The Rev. Dr. Lang, of Sydney, speaking of the Red Cedar of New South Wales and Queensland, a valuable timber, the finer qualities of which are equal in beauty to Mahogany, remarks, "On most of the rivers that fall into Moreton Bay, the Cedar has been long since cut away; for a provident Government, utterly at a loss to devise employment for the convicts during the continuance of the penal settlement, employed them in cutting down the valuable timber in all the easily accessible localities in the bay, to the serious disadvantage and loss of the inhabitants *now;* and large quantities of that timber were actually piled and *left to rot* on the beach at Dunwich, Stradbroke Island, after all the labour that had been thrown away in procuring it."

2. *Deliberate Destruction of Forests by the Natives in connection with their Superstitions.*—A notable instance of this is given by the Hon. J. Coutts Crawford, sometime Provincial Geologist of Wellington, in one of his Survey Reports, within the last five years. He describes

the Maoris of Karatea, in that province, "cutting down a beautiful *grove* of Karaka trees, to catch, roast, and eat the lizards, which are found in their hollows, as they had found that the lizard is the root of all evil!" Somewhat parallel, but on an infinitely larger and more disastrous scale, was the general firing of the forests in former times by the Maoris, who assert they were compelled to do so in order to destroy the Moa, which made a practice of running off with their infants under five years of age!

At one time—so long ago, however, as the sixteenth century—the inhabitants of the Harz district, in Germany, possessed the same ruinously liberal rights as to wood-cutting in the primitive forest, which the settlers of Otago now apparently enjoy. The resulting destruction of timber was so reckless and rapid—and so serious, moreover, in a district, which, unlike Otago, possesses no local coal deposits, and can import coal only from a great distance and at great cost—that it led to the enactment of the conservative and other forest-regulations, which have for some centuries been models for all Europe and all the world to imitate.

Not until there had been a deplorable sacrifice of the valuable Teak, did our Indian Government concern itself to any effect with the supervision of Indian forests. The arrangements it has latterly made are to be commended *so far as they go*; but they ought undoubtedly to have been made at a much earlier period in our Indian rule; while they are still defective, considering the vast area of India, and the nature and extent of supervision essential to the proper management of forests, old and new.

The history of the extinction or disappearance of the Caledonian forest—that which appears at one period to have clothed all Scotland and its isles—furnishes certain other interesting parallels to the history of the disappearance or destruction of the Otago forests, and certain other important lessons to the Provincial Government. Here again we see repeated the ruinous and reckless destruction of valuable timber on the one hand, and, on the other, the institution of conservative regulations,—sometimes attended with penalties of an extreme kind,—*when conservation was obviously too late.* It would appear that the disappearance of the Caledonian forest was partly due to climatic, in connection with geological, changes, especially to land-subsidence, as in Otago; but partly also, it was undoubtedly attributable to destruction

by man, subsequent to the Roman era. For military reasons—to open up the country, facilitate the transport of troops, and to guard against surprise—the Romans not only constructed roads through the primitive forests of Scotland, but destroyed the forest to a considerable extent on either side of all such roads. The Scottish kings and barons made lavish grants of forests to the numerous monasteries, and to the equally, or perhaps still more, numerous salt-pans established on the Scottish coasts. In both cases wood was used for fuel; and, in the latter case, the proprietors or lessees of the salt-pans had right to cut the requisite firewood from the nearest forests. During the civil commotions and the long wars with England, much wood was uselessly destroyed, and subsequently to the establishment of comparative peace cultivation began to encroach on the remaining forest land. Not, however, until the fifteenth and sixteenth centuries do we find Acts passed by the Scottish Parliament directed against the destruction of woods,—the penalties increasing in severity from the time of James I. Pecuniary fines were gradually succeeded by stocks, prison, or irons, scourging, and lastly even death; but all this severity was *too late*, for an Act of James IV. speaks of the primitive Scottish forest as being in his time "utterly destroyed."

There are, unfortunately, too numerous precedents for the position of inaction or indifference of the New Zealand Government in regard to the care and culture of the timber resources under its control; but this ought to afford no proper ground of excuse in a new country, which has the opportunity of avoiding the errors, and profiting by the lessons, exhibited by older nations or communities. It must be a sorry sort of satisfaction or consolation, which can be derived from the fact, that Britain and her possessions have played the *rôle* of the New Zealand Government and colonists in regard to their timber resources over and over again,—have apathetically neglected or obstinately refused to avail themselves of a vast accumulation of the most disastrous experience!

All experience shows that when the virgin forest of New Zealand succumbs to natural decay, or to natural destructive agencies, or when it is destroyed by the agency, direct or indirect, of man—the valuable timber-yielding trees are *not* succeeded by a young and vigorous growth of the *same species*, but generally by a different and inferior growth,—sometimes only fruticose,—occasionally only Cryptogamic. It is, in-

deed, hopeless to expect healthy growth of trees or shrubs in the dark, dank, confined atmosphere of the jungly bush, or in its deep, wet soil of vegetable mould. I believe that the present forests are doomed, in great measure at least, to ultimate decay and disappearance; and I think further that the future and *permanent timber-supplies* of Otago and New Zealand must be looked for from *forests yet to be artificially reared* and cultivated;—the site of which will be fresh lands to be suitably selected, and the constituents whereof will consist in great measure of *introduced* or *acclimatized trees of a hardier kind*. Nevertheless nothing is yet being done by provincial or general governments to provide for the replacement of the valuable timber that is now rapidly being lost or sacrificed!

The present condition of the Harz forest, in Germany, represents what I believe will in course of time be very much that of the Otago forests. The present Harz forest may be said to be the *result of systematic cultivation;* the most valuable trees are *not* the original or indigenous growth of the district, but have been *introduced and acclimatized*. The same may be said of the present forests of Britain. All that I saw in Otago, and generally in New Zealand, led me to regard it as a grave error of omission that the provincial or general governments had not, when the settlements were founded, established, in some form, a *Board of Commissioners or Inspectors of Forests*, with a staff of wood-bailiffs, and all other grades of officers proportionate to the requirements of the time and the progressive growth of the colony. They would have exhibited only a prudent foresight, only a paternal protection of one of the material sources of prosperity of a new colony, had they done so. I am strongly of opinion, further, that the institution of some such Board cannot too soon form a subject of consideration by the proper authorities, to whom I would venture to commend as a model for guidance the admirable regulations of the Harz forest in Germany, with which I became personally acquainted in 1850, and to which I drew attention at that time.* Much and important work awaits a New Zealand Board of Forests. Its more immediate function will be, on the one hand, to *improve and protect the existing forests*, and on the other, to *rear new ones of hardier growth*, permanently

* *Vide* Proceedings of the Botanical Society of Edinburgh for 1853, or 'Phytologist,' vol. iv. p. 985 (1853).

to supply the place of those, which are so manifestly disappearing, and which so assuredly will not reproduce themselves.

The experiments of individual settlers have already abundantly shown the facility and rapidity with which various exotic trees—especially those of Australia and Tasmania, *e.g.* the Blue Gum, Silver Wattle, and Stringy Bark—may be grown in Otago; and the result generally of these experiments, on the small scale, are most encouraging as regards the establishment of others on a more extensive scale, having in view the introduction of substitutional or supplementary timber-trees of hardier and easier growth, and of equal permanent value. Where experiment on the small scale has failed, it has done so most probably, in the majority of instances, from inattention to that fundamental canon of all acclimatization-experiments, viz. that *the natural circumstances or conditions of growth should be strictly imitated.*

DE NOVA SAGINÆ SPECIE NOTULA;

EXSCRIPSIT HENR. F. HANCE, Ph.D., REL.

Sagina (Spergella) Sinensis, n. sp.; pentamera, cauliculo centrali sterili (nunc deficiente) lateralibus numerosis elongatis filiformibus adscendentibus floriferis 3–7-pollicaribus ramosis inferne glabris superne cum pedicellis calycibusque glanduloso-puberulis, foliis linearibus setaceo-mucronatis inferioribus glaberrimis superioribus glanduloso-ciliatis, pedicellis filiformibus rigidis foliis 2–3-plo calycibus 4–6-plo longioribus peracta anthesi apice subcernuis demum stricte erectis, sepalis ovalibus late albo-marginatis obtusis capsulæ appressis, petalis iis æquilongis ovalibus obtusis, staminibus 5, capsula ovoidea calyce triente longiore ad medium usque 5-fida valvis apice truncato-obtusis, seminibus cinnamomeis undique æqualiter tuberculatis.

In agris arenosis prope mare, ins. Kú-lang-sú, ex adverso urbis Amoy, coll. indefessus Sampson, mense Maio 1866. (Exsicc. n. 13060.)

Haud omnino absque hæsitatione novam ausus fui condere speciem in genere, quod jam recentiores botanistæ quam certissime in plures falsas discerpserunt species, sed cum nulla inter Europæas plane congruit. Valde profecto adpropinquat *S. subulatæ*, Wimm., quæ tamen statim dignoscitur statura multo humiliore, pedicellis quoad folia multo

longioribus, habitu aspectuque prorsus diverso; sunt enim in hac vix unquam plures quam duo flores singulo cauliculo, unde, ob pedunculorum longitudinem ac gracilitatem, quasi scaposa videtur, dum Sinicæ stirpis caules elongati sæpe pedunculos florigeros 6–8 ex singulo ramo per totam longitudinem folioso proferunt; porro, teste Bertolonio (Fl. Ital. iv. 776), "seminibus dorso canaliculatis, oris canaliculi nigro-circellatis;" hunc ultimum vero characterem detegere non valeo, nam utriusque plantæ semina, oculo fortius etiam armato, mihi plane similia visa sunt. Reichenbachius pater, de specie Wimmeriana disserens (Fl. Germ. excurs. iii. 794), hæc habet, "Flores dicuntur sæpius pentandri, rarius decandri;" Bertolonius (loco laudato), "Stamina quinque tantum ego vidi;" sed reliqui prope omnes floristæ Europææ, plantam in sectione staminibus decandris distincta collocantes, de hacce semicastratione penitus siluerunt. Conferas tamen Morisii v. cl. observationes (Fl. Sard. i. 283). *S. procumbentis* nomen invenio in enumeratione plantarum in Britannia simulque in India orientali crescentium, a cell. Hookero fil. et Thomsonio in prolegomenis ad 'Floram Indicam' descripta; ast, ni fallor, *S. subulata* nusquam per totas Asianas regiones hactenus detecta fuit; imo, secundum Tchihatcheffii opus 'Flore de l'Asie-Mineure,' ab Asia maxime occidua exsulat, nec amplius, monente Grisebachio (Spicil. Fl. Rumel. et Bithyn. i. 196), in Europæ terris conterminis occurrit. *S. maxima*, A. Gray (Mem. Amer. Acad. vi. 382, adn.; Miquel, Ann. Bot. Mus. Lugd.-Bat. ii. 79), cui Thunbergius stylos staminaque quatuor, A. Grayus vero stamina 8–10 stylosque 4 tribuit, unde inter *Eusaginas* et *Spergellas* ambigere videtur, nostræ forsan propinqua, sed eam non vidi. Utrum vero stirps supra descripta sinceram constituat speciem, an rectius pro varietate insigni *S. subulatæ* habenda sit, peritioribus dijudicandum relinquo.

Scripsi Whampoæ, a. d. XVI. Kal. Octob. a. 1867.

A PEMPTADE OF NEW CHINESE MONOCHLAMYDEÆ.

By Henry F. Hance, Ph.D., etc.

I. *Corispermum tylocarpum*, n. sp.; annuum, parce et minute puberulum, caule a basi ramoso, ramis elongatis patulis a basi fere florigeris, foliis linearibus acutis mucronatis, spicis elongatis gracilibus

densifloris, bracteis inferioribus lanceolatis v. linearibus fructu plerumque angustioribus superioribus ovatis acuminatis late albo-marginatis fructum latitudine æquantibus eoque dimidio circ. longioribus, fructibus stellato-pilosis crebre et conspicue glanduloso-tuberculatis oblongis anguste marginatis integris bicuspidatis.

In alveis siccis sabulosis torrentium agri Pekinensis, a. 1866, invenit Dr. S. W. Williams. (Exsicc. n. 13489.)

This seems, from its peculiar achænium, quite distinct from any of the Amurian or Central Asiatic species, described by Professor Bunge in the 'Flora Amurensis' or 'Reliquiæ Lehmannianæ.' The genus is not recorded by Maximowicz as found near Peking.

534 II. *Thesium psilotoïdes*, n. sp.; radice lignosa, caulibus numerosis erectis 5–6-pollicaribus tenuibus a medio ramosis ramulis divaricatis, foliis minimis (semilinealibus) squamiformibus appressis sphacelatis uninerviis secus caulem longe decurrentibus et angulos acutos efformantibus, floribus solitariis vel 2–3 aggregatis duas tertias lineæ longis ramulos terminantibus bracteolis 5-foliis similibus perigonio brevioribus circumdatis, perigonio sordide flavido ad medium 5-fido, stylo staminibus paulo breviore in stigma ovoideum potius quam capitatum sensim dilatato, nuce ovoidea longitudinaliter costata atque nervillis validis transversis reticulata lobis perigonii brevibus arcte appressis leviter umbonata.

Prope monasterium buddhisticum ad colles Pakwan, supra urbem Cantonem, autumno 1866, primus detexit T. Sampson: ad cacumina herbida eorumdem montium parce crescentem ego ipse legi d. 12 Julii, 1867. (Exsicc. n. 13749.)

A very curious little species, of which but very few specimens have been found. The number of bracts or bractlets, all arising apparently from about the same plane, seems to indicate this as extremely distinct.

1444 III. *Salix (Amerina, fragiles, diandræ,) Cantoniensis*, n. sp.; arbuscula erecta, ramis cortice saturate castaneo obductis foliisque maturis glaberrimis, his exacte lanceolatis basi acutis apice sensim acuminatis bipollicaribus medio dimidium pollicem latis glanduloso-serrulatis supra lucidis subtus opacis glaucinis subtilissime reticulatis petiolo 2–4-lineali suffultis, stipulis lanceolatis caducis, amentis ♂ brevissime pedunculatis foliis paucis sæpius suffultis 1–1½-pollicaribus erectis densifloris cylindricis ab ima basi florentibus, rachi cinereo-lanata, squamis lanceolatis acutis pallide brunneis albo-hirsutissimis, filamentis

binis complanatis gracilibus squamas duplo superantibus, antheris rotundatis luteis, amentis ♀ adhuc ignotis.

Ad rivulorum margines in delta fl. Cantoniensis, certe spontaneam, m. Februario 1867, collegit Sampson. (Exsicc. n. 13757.)

It is to be regretted that Mr. Sampson did not meet with the female of this tree. In so exceedingly difficult a genus it is almost impossible to pronounce with any certainty whether a form is entitled to specific rank or not; but I have thought it desirable to draw up the above diagnosis, because, if I am not mistaken, this is the only Willow really found wild in Southern China. *S. Babylonica* and *S. tetrasperma* are planted, and the latter may possibly be spontaneous, but I do not think such is the case. The Canton plant is perhaps nearest *S. dealbata*, And. I should add, that I have compared it with the wild stirps of *S. alba* (=*S. Kassanogluensis*, Kty.) with *S. fragilis*, L., and *S. acmophylla*, Boiss.

IV. *Pellionia Grijsii*, n. sp.; monoica, pilis reversis curvulis hirsuta, foliis alternis (altero scilicet abortiente) oblique ellipticis caudato-acuminatis paulo infra medium usque ad apicem crenato-serratis basi obliquissime cordatis supra scabris infra pubescentibus 4-pollicaribus breviter petiolatis, cymis ex axillis superioribus longius pedunculatis folium dimidium æquantibus dichotomis corymbosis ♂ et ♀ similibus, floribus (an semper?) pentameris, perigonii fructiferi segmentis sub apice mediocriter aristatis, achænio subgloboso glabro, perigonii masculi parum majoris segmentis paulo inæqualibus.

Unicum accepi specimen a cl. De Grijs, in prov. Fokien a. 1861 lectum. (Exsicc. n. 6704.)

Allied to *P. heteroloba*, Wedd., and *P. scabra*, Bth., which it strikingly resembles in foliage, but readily distinguished by its very different inflorescence.

V. *Cudranus* (v. *Cudrania*) *trilobus*, n. sp.; frutescens, ramulis angulatis tomentosis, foliis alternis e basi rotundata rhombeo-ovatis plus minus distincte trilobis lobis lateralibus intermedio brevioribus obtusis v. rotundatis nunc subobsoletis supra pilosulis demum glabratis siccitate nigricantibus subtus pallidioribus sparse pilosulis viridibus rete creberrimo venarum purpurearum haud elevatarum conspicue notatis 1½ poll. longis medio 1¼ poll. latis, petiolo 5-lineali, stipulis minutis, spinis solitariis axillaribus 5 lineas longis rectiusculis, capitulis ♂ geminatis 2½ lineas diametro pedunculo sesquilineali suffultis.

In interioribus provinciæ Shan-tung, Chinæ borealis, legit Rev. J. R. Graves, a. 1866. (Exsicc. n. 13250.)

Although I have been unwilling to risk the destruction of the capitula by subjecting to examination the not fully expanded flowers of the only specimen in my possession, yet I have not a doubt of the genus to which this interesting plant belongs, on account of the exact resemblance of its capitula and spines to those of *C. Rumphii*, Thw.; and also from the remarkable cucullately-imbricating perigone-lobes, so well represented by Blume. (Mus. Bot. Lugd. Bat. ii. t. 31.)

CURIOUS EPIPHYTES FROM CAPE YORK, NORTH AUSTRALIA.

By George Bennett, M.D., F.L.S.

Captain Nares, of H.M.S. Salamander, brought from Cape York, on the 15th September, 1866, some very curious *Epiphytes*, which he presented to the Botanic Gardens at Sydney. They were found growing on old trees in the form of large irregular tubers, and fastened to them by fibrous roots; from these tubers arose a few thick, short, fleshy branches, the leaves being crowded at their rounded extremities. These plants were considered, when first brought, to be new, and new they certainly were, as far as having been discovered in Australia; but it has since been ascertained that they are natives of the Molucca Islands, Sumatra, and Java. The two plants are of allied genera of the Natural Order *Rubiaceæ*, and were first described and figured by Rumphius (Herb. Amboyn, vol. vi. p. 119, 1750), and subsequently by Dr. Jack, in 1823 (Linn. Trans. vol. xiv. p. 122). One is *Myrmecodia armata*, of which the bark of the tuber is covered with small thorns, and is of a grey colour; the leaves are leathery, long, narrow, and of a dark green colour. The other is *Hydnophytum formicarum*, the bark of which is smooth, and of a greyish colour; the leaves are small, leathery, and of a dark green colour. De Candolle describes two species in each genus—*Myrmecodia tuberosa* (Molucca) and *M. armata* (Java), *Hydnophytum formicarum* (Molucca) and *H. montanum* (Java); of these, *M. armata* and *H. formicarum* are now known to be also indigenous to Australia. Both genera were brought by Captain Nares from Cape York, at the same time and in about equal numbers,

indicating that they were both found growing in the same locality. Dr. Jack observes, "I am not aware that these plants have been described by any botanist since the time of Rumphius, or that any conjecture has been made regarding their place and family from his figures or description. From their common habit as *Epiphytes*, I should have been much inclined to place them under one genus; but the different number of seeds in each drupe, supported by the difference of a simple and bifid stigma, seems to oppose this, while the distinction is further confirmed by the different disposition and insertion of the leaves, which in *Hydnophytum* are arranged precisely as usual in the *Rubiaceæ*, but in *Myrmecodia* are crowded round the thick fleshy branches in such a manner that their being really opposite is not immediately apparent, while their insertion on their broad peltate basis is further peculiar." The largest tuber of *H. formicarum* in the Botanic Gardens collection measured three feet seven inches in circumference, but in those of *M. armata* none exceeded one foot eleven inches in circumference. A very singular fact connected with these plants is that the tubers are generally inhabited by ants, and hollowed by them into numerous winding passages extending in every direction. This having been mentioned as peculiar to those found in the Eastern Islands, it was interesting to observe if it also obtained in the specimens brought from Cape York. On first examining *H. formicarum*, I observed the tubers appeared fistular, and on closer examination, several small ants of a brownish colour were observed passing in and out of these openings. I therefore selected one plant which was nearly dead, and on a section being made, a series of galleries was seen branching through every part of the tuber, having a very singular appearance. The galleries are lined with a coating of animal matter of such extreme tenacity that, as the tuber decays, the galleries may be removed entire. I next selected a specimen of *M. armata*, and a section was made with the same result, except that, this tuber being moister than the preceding, the galleries were not formed to so great an extent. These observations prove that the ants form their galleries in the tubers of the plants from Cape York as in the Eastern Islands, and are probably never known in any other condition.

Specimens of these curious plants were sent by Mr. C. Moore to Dr. Hooker, for the Royal Gardens at Kew, in December 1866, but having understood they had not arrived, a second collection was sent

by the mail steamer in May 1867, and I have now received a letter from Dr. Hooker, dated July 31st, acknowledging the receipt of both collections at Kew, explaining the cause of the error in not acknowledging the receipt of the first collection, and some interesting information on the management of these singular *epiphytes*. Dr. Hooker says, "Your letter of May 20th has solved a great mystery—the very curious plants so much talked of by Mr. Moore, and now by yourself, arrived in due course full six months ago; but being only previously known at Malacca, and the absence of any announcement of the vessel they were to come by, I never for a moment supposed that they were from Australia. The two plants are allied genera of *Rubiaceæ*, both described in De Candolle, *Myrmecodia* and *Hydnophytum*. They are plants we have often written to Malacca for, but never obtained, and naturally supposed, when they arrived, they were from some of our Straits correspondents. Their discovery in Australia is most remarkable.* Of the first batch received, the *Myrmecodia armata*, and of the box now arrived, the *Hydnophytum formicarum*, are alive. I am, indeed, obliged to you for these most curious plants. I shall be very glad of another consignment of them. You should, I find, keep them in a damp shady place. I wonder if the ants that infest them at Cape York are of the same genera as the Straits' ones!"

Sections of the tubers have been sent to the Australian Museum.—November 4, 1867.

REVISION OF THE NATURAL ORDER HEDERACEÆ.

BY BERTHOLD SEEMANN, PH.D., F.L.S.

(*Continued from Vol. V.*)

ON THE GENUS PANAX.

Panax has been made one of the great lumber-rooms of our science, and none of the modern botanists have assigned to it intelligible limits. Linnæus referred *three* species to it, representing two generic types, and his generic name ought to go with the majority of species

* Representatives of both genera had, however, been previously discovered in Australasia, viz. Viti, about 8° further south than Cape York. (Conf. Seem. Fl. Vitiensis, p. 138.)—EDITOR.

represented by *P. quinquefolium* and *P. trifolium.* Both these species have a dimerous ovary and five petals, quincuncial in æstivation, the latter character assigning them a place amongst the *Araliaceæ* proper; whilst Linnæus's third species (*P. fruticosum*) has petals valvate in æstivation, and therefore stands as the type of the genus *Nothopanax* in my Revision of *Hederaceæ.* If the species referred to *Panax* by authors are examined, it will be found that but few agree generically with *P. quinquefolium* and *P. trifolium*; but that all those that do agree have the same habit and partake of similar medicinal properties, being perennial herbs, with tuberous roots, and with verticillate, digitate leaves, terminal solitary simple umbels, and coloured berries; moreover, they are distributed geographically over North America and Eastern and Central Asia. I therefore restrict the genus to these species only. It will be seen that these views are at variance with those advanced by Decaisne and Planchon (Revue Hortic. 1854, p. 105), who shift *P. quinquefolium* and *P. trifolium* to *Aralia*, retain the name *Panax* for *P. fruticosum*, and unite with it the genera *Polyscias*, Forst.; *Cheirodendron*, Nutt.; *Pseudopanax*, C. Koch; and *Maralia*, Pet. Thouars. Bentham and Hooker f. (Genera Plant. p. 938) entertain similar views with regard to shifting *P. quinquefolium* and *P. trifolium* to *Aralia*, the retention of the generic name *Panax* for *P. fruticosum* and its allies, and the union of *Cheirodendron* and *Maralia* with their *Panax*; but they exclude, as I had previously done, *Polyscias* and *Pseudopanax*. Yet, even with these two latter genera removed, Bentham and Hooker's *Panax* remains ill-defined. Having excluded *Pseudopanax*, the learned authors ought to have removed *Cheirodendron* along with it, as that genus is so closely allied to it as almost to justify those desirous of forming large genera to unite the two. *Oligoscias* (*Maralia?*), which the two authors also incorporated with *Panax*, has nothing to do with that genus as defined by them, having ruminate albumen, which would entitle it a place among their tribe *Hedereæ.*

Panax, Linn. Gen. n. 1166, ex parte.—Char. gen. emend.: Pedicelli articulati. Flores calyculati, polygamo-monoici. Calycis margo obscure 5-dentatus. Petala 5, ovata, acuta, æstivatione quincunciali. Stamina 5, filamenta brevissima; antheræ ovatæ v. oblongæ. Ovarium 2- v. per excessum 3-loculare, loculis 1-ovulatis. Drupa baccata, didymo-compressa (colorata), 2- v. per excessum 3-loculare. Semina in loculis

solitaria, pendula. Albumen æquabile.—Herbæ perennes, Amer. bor., Japon., Chin. et Ind. or. indigenæ, radice crassa, tuberosa; caule solitario, foliolorum verticillum unicum proferente; foliis palmatim 3–5-foliolatis; umbellis terminalibus simplicibus.—*Aureliana*, Lafit. Mém. du Ginseng. *Araliæ* sp. auct. *Eupanax* (subgenus), Torrey et Gray, Fl. N. Am. i. p. 647.

* *Folia trifoliolata.*

1. *P. trifolium*, Linn. Spec. ii. p. 1058; Torr. et Gray, Fl. N. Amer. i. p. 648.—*P. pusilla*, Sims, Bot. Mag. t. 1334. Nom. vernac. Bor.-Amer. "Dwarf Ginseng," v. "Ground Nut."—North America, from Canada to the mountains of the Southern United States (Kalm! Bartram! ann. 1764, Nuttall! Kertland!).

** *Folia quinquefoliolata.*

2. *P. quinquefolium*, Linn. Spec. ii. p. 1058; Torr. et Gray, Fl. N. Amer. i. p. 648; C. A. Meyer in Bull. de la Class. phys. math. Ac. St. Petersb. i. 340; Walp. Rep. v. p. 925.—*Aureliana Canadensis*, Lafit. Mém. du Ginseng, cum icone; Catesb. Hist. Carol. iii. p. 16. t. 16. *Araliastrum foliis ternis quinquepartitis*, Ginseng et Nizier officin., Trew, Plant. Select. i. t. 6; Lam. Encycl. Meth. ii. 723. t. 860, fig. 1; Bot. Mag. t. 1333. Nom. vern. Bor.-Amer. "Ginseng."—Woods of North America, from Canada to the Southern United States (Kalm! Bartram! Kertland!).

3. *P. Ginseng*, C. A. Mey. l. c.; Walp. Rep. v. p. 924.—*P. quinquefolium* v. *P. Ginseng*, Regel, 'Gartenflora,' 1862, sp. 314. t. 375? *P. quinquefolium*, *β. Coreense*, Siebold, Verh. Bat. Genoot. xii. *P. Schinseng*, var. *Coreense*, Nees, Suppl. Plant. Med. i. t. 16. fig. A.—Mantchuria and Corea.

4. *P. Pseudo-Ginseng*, Wall. Plant. Asiat. Rar. ii. p. 30. t. 137; C. A. Meyer, l. c.; Walp. Rep. v. p. 924; Pharm. Centralblatt, 1832, p. 353. t. 3. *P. Schinseng*, var. *Nepalensis*, Nees, l. c. fig. C.—Mountains of India (Wallich! n. 3730, Hook. f. et Thomson! Griffith!)

5. *P. bipinnatifidum*, Seem. (sp. nov.); perenne, herbaceum; foliis verticillatim 3–5-nis, digitatim 5-foliolatis, foliolis bipinnatifidis, supra ad nervos pilis hispidis sparsis, demum glabratis; pedicellis apice articulatis, calyculo obscuro v. nullo; stylis 2–3.—Sanding, East Indies (Herb. Hook.).—"Berries like crabs'-eyes, exactly, with a broad black pallet at top." Allied to *P. Pseudo-Ginseng*.

Species exclusæ :—

P. aculeatum, Ait.=*Acanthopanax aculeatum*, Seem.
P. Anisum, De Cand.=*Nothopanax Anisum*, Miq.
P. anomalum, Hook.=*Nothopanax anomalum*, Seem.
P. arboreum, Forst.=*Nothopanax arboreum*, Seem.
P. armatum, Wall.=*Aralia armata*, Seem.
P. Australasia, Pers.=*Nothopanax arboreum*, Seem.
P. australis, Schult.=
P. attenuatum, Swartz=*Didymopanax glabratum*, Dcne. et Planch.
P. bijugum, Wall.=*Pentapanax Leschenaultii*, Seem.
P. Boivini, Dcne.=*Sciadopanax Boivini*, Seem.
P. calvum, Cham.=*Didymopanax calvum*, Dcne. et Planch.
P. Caribbæum, Sieb.=*Didymopanax glabratum*. Dcne. et Planch.
P. cephalobotrys, F. Muell.=*Nothopanax cephalobotrys*, Seem.
P. chrysophyllum, Vahl=*Didymopanax chrysophyllum*, Dcne. et Pl.
P. chrysophyllum, Pœpp.=*Didymopanax Pœppigii*, Dcne. et Planch.
P. cochleatum, De Cand.=*Nothopanax cochleatum*, Miq.
P. Colensoi, Hook. f.=*Nothopanax Colensoi*, Seem.
P. conchifolium, Roxb.=*Nothopanax cochleatum*, Miq.
P. coriaceum, Regel=*Pseudopanax crassifolium*, C. Koch.
P. crassifolium, Dcne. et Planch.=*Pseudopanax crassifolium*, C. Koch.
P. crenatum, Dietr.=
P. curcifolia, Griffith=*Brassaiopsis Hainla*, Seem.
P. decaphyllum, Sagot=*Sciadophyllum decaphyllum*, Seem.
P. decompositum, Wall.=*Aralia Cachemirica*, Dcne.
P. dendroides, F. Muell.=*Nothopanax sambucifolium*, C. Koch.
P. digitatum, Sweet=
P. divaricatum, Sieb. et Zucc.=*Acanthopanax divaricatum*, Seem.
P. Edgerleyi, Hook. f.=*Raukana Edgerleyi*, Seem.
P. elegans, Fras.=*Nothopanax elegans*, Seem.
P. Finlaysonianum, Wall.=*Aralia Finlaysoniana*, Seem.
P. foliolosum, Wall.=*Aralia foliolosa*, Seem.
P. Forsteri, Dcne. et Planch.=*Polyscias pinnata*, Forst.
P. fragrans, Roxb.=*Heteropanax fragrans*, Seem.
P. fruticosum, Linn.=*Nothopanax fruticosum*, Miq.
P. Gaudichaudii, De Cand.=*Cheirodendron Gaudichaudianum*, Seem.
P. glabrata, H. B. K.=*Didymopanax glabratum*, Dcne. et Planch.
P. Gunnii, Hook. f.=*Nothopanax Gunnii*, Seem.

P. (?) *Hainla*, De Cand.=*Brassaiopsis Hainla*, Seem.

P. Heyneanum, Wall.=*Polyscias pinnata*, Forst.

P. Heyneanum, Wall. Cat.=*Arthrophyllum.*

P. horridum, Smith=*Horsfieldia horrida*, Seem.

P. innovans, Sieb. et Zucc.=*Acanthopanax innovans*, Seem.

P. Jackianum, Wall.=*Arthrophyllum.*

P. Leschenaultii, De Cand.=*Pentapanax Leschenaultii*, Seem.

P. Lessonii, De Cand.=*Pseudopanax Lessonii*, C. Koch.

P. lineare, Hook. f.=

P. longipetiolatum, Pohl=*Didymopanax.*

P. longissimum, Hook. f.=*Pseudopanax crassifolium*, C. Koch.

P. Loureirianum, De Cand.=*Acanthopanax aculeatum*, Seem.

P. Macgillivrayi, Benth.=*Nothopanax Macgillivrayi*, Seem.

P. macrocarpus, Schlecht.=

P. Maralia, Dcne. et Planch.=*Maralia Madagascariense*, Thou.

P. margaritifera, Vis.=*Nothopanax sambucifolia*, C. Koch.

P. micranthum, Wall.=*Vitis* v. *Verbenacea.*

P. mollis, Benth.=*Nothopanax mollis*, Seem.

P. Morototoni, Aubl.=*Didymopanax Morototoni*, Dcne. et Planch.

P. multijugum, Hook. f. et Benth.=*Nothopanax multijugum*, Seem.

P. Murrayi, F. Muell.=*Nothopanax Murrayi*, Seem.

P. nodosum, Wall.=*Aralia.*

P. obtusum, Blume=*Nothopanax obtusum*, Miq.

P. ovatum, Hook. et Arn.=*Cheirodendron Gaudichaudii*, Seem., var *ovatum.*

P. palmatum, Roxb.=*Brassaiopsis Hainla*, Seem.

P. parviflorum, Mart. et Zucc.=*Didymopanax parviflorum*, Dcne. et Planch.

P. pinnatum, Lam.=*Arthrophyllum.*

P. pinnatum, Miq.=

P. pinnatum, A. Rich.=*Nothopanax farinosum*, Seem.

P. platyphyllum, Hook. et Arn.=*Cheirodendron platyphyllum*, Seem.

P. polybotrys, F. Muell.=*Nothopanax elegans*, Seem.

P. polycarpum, Wall.=

P. ricinifolia, Sieb. et Zucc.=*Acanthopanax ricinifolia*, Seem.

P. sambucifolium, Sieb.=*Nothopanax sambucifolium*, C. Koch.

P. Samoense, A. Gray=*Nothopanax Samoense*, Seem.

P. scutellarioides, Reinw.=*Nothopanax cochleatum*, Miq.

P. secunda, Schult.=

P. sericeum, Pohl=*Didymopanax sericeum*, Dcne. et Pl.

P. serratum, Wall.=*Heptopleurum venulosum*, Seem., et *Macropanax oreophilum*, Miq.

P. sessiliflorum, Rupr.=*Acanthopanax sessiliflorum*, Seem.

P. simplex, Forst.=*Nothopanax simplex*, Seem.

P. simplicifolium, Dietr.=? *Nothopanax simplex*, Seem.

P. Sinclairi, Hook. f.=*Nothopanax Sinclairi*, Seem.

P. speciosum, Willd.=*Didymopanax speciosum*, Dcne. et Pl.

P. spinosum, Linn. f.=*Acanthopanax spinosum*, Miq.

P. spinosum, Poir.=*Didymopanax.*

P. splendens, H. B. K.=*Didymopanax splendens*, Dcne. et Pl.

P. tomentosum, Wall.=*Agalma tomentosum*, Seem.

P. tripinnatum, Wall.=*Aralia Cachemirica*, Dcne.

P. undulatum, H. B. K.=*Didymopanax.*

P. undulatum, Pers.=*Didymopanax Morototoni*, Dcne. et Pl.

P. vinosum, Schlecht.=*Didymopanax sericeum*, Dcne. et Pl.

P. Zippelianum, Miq.=*Nothopanax Zippelianum*, Seem.

TETRAPANAX, C. Koch, Wochenschrift für Gärtn. und Pflanzenk. 1859, p. 371; Ed. Otto et Sonder in Hamburg. Gartenz. 1862, p. 61. Pedicelli inarticulati. Flores ecalyculati, hermaphroditi. Calycis margo obsoletus. Petala 4 v. 5, ovata, acuta, æstivatione valvata. Stamina 4 v. 5; filamenta elongata; antheræ elliptico-ovatæ. Styli 2, erecti, demum recurvi. Ovarium 2-loculare, loculis 1-ovulatis. Drupa baccata.—Frutex Chinensis, inermis, stoloniferus, caule erecto 5–9-ped. striato annulato intus copiose albissimo-medulloso; foliis terminalibus longe petiolatis amplis palmatim lobatis, lobis omnibus acutis serratis, subtus (præcipue junioribus) totis stellato-subferrugineo-tomentosis, stipulis 2 magnis subulatis; umbellis in paniculas terminales amplas dispositis; floribus albido-flavis.—*Didymopanax*, subg. *Tetrapanax*, C. Koch, Wochenschrift, n. 10, p. 71. *Araliæ* sp., Hook.

Prof. C. Koch was the first to perceive that the plant described by Hooker as *Aralia papyrifera* had nothing to do with *Aralia*, and therefore referred it as a subgenus to *Didymopanax*,—subsequently separating it as a distinct genus (*Tetrapanax*), to which he thought *P. innovans* and *P. ricinifolium* might possibly belong. But both turn out

to be species of *Acanthopanax*, a genus differing in its spinose habit and dry fruit from *Tetrapanax*, but which is by far more intimately related to it than *Fatsia*, to which Hook. fil. and Bentham (Gen. Plant. p. 939) have referred both *Aralia papyrifera* and *A. erinacea* (=*Horsfieldia*). Ed. Otto has already pointed out (Hamburg. Gartenz. l. c.) that in *Aralia papyrifera* pentamerous flowers predominate over the tetramerous ones, and that the name *Tetrapanax* is on that account open to objection; but if we had to change every inappropriate name our botanical nomenclature would have to undergo considerable alterations, and I therefore shall retain C. Koch's name. The only species of *Tetrapanax* at present known is the following:—

1. *T. papyrifera*, C. Koch, l. c.—*Aralia (?) papyrifera*, Hook. in Kew Journ. iv. p. 53. t. 1 et 2. *A. papyrifera*, Hook. Bot. Mag. t. 4897; Fl. des Ser. viii. t. 806, 807: xii. t. 1201; G. Bennett, Gatherings of a Naturalist, t. 6; G. Bennett's Wanderings, vol. ii. p. 77, cum icone (1834); ejusd. in Seem. Journ. of Bot. 1834, p. 309; "Rice-paper Plant" of English Gardens.—Island of Formosa.

Interesting particulars about the habit of this plant are given in this Journal by Dr. Bennett, who, it appears, was the first to publish a figure of the Rice-paper Plant. It throws up numerous suckers, and the suckers flower the second year after they have been removed from the mother plant, and every time after flowering form two new branches.

CORRESPONDENCE.

Ononis reclinata *in Devonshire.*

4, *Portland Villas, Plymouth*, 28*th Dec.* 1867.

A botanical friend, Mr. E. Holmes, of 2, Arundel Crescent, Plymouth, has this day given me a couple of specimens of *Ononis reclinata*, L., which plant he found growing with *Bupleurum aristatum* (Bartl.) at Berry Head, Devon, on 14th June, 1865.

I told him of the importance of the fact, but his diffidence would not allow him to write a statement of it for the 'Journal of Botany;' consequently I am induced to employ my pen for him. I have never been at Berry Head myself, so am unwilling to express an opinion as to whether it is indigenous or otherwise; but to prove that no mistake has been made with regard to the species, I enclose a specimen obtained there by Mr. Holmes.

J. R. Archer Briggs.

Dothidia Pteridis.

Wakefield, Jan. 9th, 1868.

Please correct a misprint in my note on *Dothidea Pteridis* in last number of 'Journal of Botany.' The locality should be Torgoyle, a few miles from *Invermorriston*, Inverness-shire. I have not seen Mr. Cooke's 'Fern Book for Everybody,' therefore I did not know he had recorded this discovery, which I made known to him by forwarding specimens at the time.

T. W. Gissing.

Cyperus longus, *Linn.*

Newport, Isle of Wight, 14*th January*, 1868.

In one of the two Isle of Wight localities for *Cyperus longus*, Linn., the plant is likely to be exterminated. On my way to another plant yesterday morning, I found that the wet meadow opposite Apesdown Farmhouse was being drained and brought into better cultivation. Possibly, the plant may survive another season, but if the field is to be turned into an arable one, there will be little chance of it.

I have said "the *two* localities" because of those given by Dr. Bromfield in 'Flora Vectensis,' the two in East Medina must be one and the same. Mr. A. G. More, in his sketch of the Flora of the Isle of Wight, published in Venable's 'Guide,' only mentions one, and that is the one referred to by Dr. Bromfield as being on the property of the late George Kirkpatrick, Esq. The dates, also, appended to the two localities differing by an interval of five years, may lead to the conclusion that in 1844 Dr. Bromfield meant only to name as "Castle Mead Niton," the locality which, in 1839, he had described as a meadow near Niton.

Of the two localities in West Medina, that near Carisbrooke Castle must, I fear, be expunged, leaving only the Apesdown one, in which, till now, the plant has been abundant.

Fred. Stratton.

BOTANICAL NEWS.

Dr. L. Lindsay has in the press 'Contributions to New Zealand Botany,' and 'Outlines of Lichenology' and 'Lichenologia Britannica,' to be published by Williams and Norgate, London and Edinburgh.

Although descriptions of the vegetation of many English counties have been published, Middlesex has not hitherto received similar attention. The neighbourhood of London, however, has been the field of the investigations of the majority of English botanists from the days of William Turner (the father of botany in England) to our own time, and the results of their labours remain widely scattered through their writings. To collect these records in an accessible form, to bring together every fact of importance relating to the past and present vegetation of the county, and thus to trace the changes produced in its flora by the extension of the Metropolis and by other causes, is the principal object of a 'Flora of Middlesex,' by Henry Trimen, M.B. Lond., F.L.S.,

Lecturer on Botany, St. Mary's Hospital; and W. T. Thiselton Dyer, B.A., now in the course of preparation, and will be published by Mr. Hardwicke.

'Our Mountain Ranges, how their Resources may be turned to account, and India converted into a Garden and Grain-store of the World,' is the title of a pamphlet of thirty-one pages, accompanied by diagrams and plans, published at Madras, by the Superintendent of the Government Botanical Gardens and Chinchona Plantations at Ootacamund, in the Neilgherry Hills, Mr. W. Graham M'Ivor, which embodies an original idea for irrigating land, of which one of our greatest engineers, Mr. J. Scott Russell, speaks in the highest terms. The principal points of his new method are extraordinary economy, the highest degree of stability, and a degree of safety when executed which human labour would scarcely be made to possess by any degree of care, the great rapidity of execution, capability of being extended to a gigantic size, and special adaptation to the speedy introduction of works of irrigation in India.

In 'El Federalista,' a Venezuelan newspaper of the 23rd of October, we find a report of a meeting of the Natural History Society of Caracas (the establishment of which we previously announced). Amongst the new publications presented were 'Pescatorea,' the 'Botanical Magazine,' and 'The Journal of Botany.' Mr. Ernst read a paper on Vegetable Ivory, which, it appears, also grows in abundance in Venezuela, about Maracaibo, etc., but it would be desirable to ascertain what species it is, as M. Wendland, who has, with good reason, referred *Phytelephas* to the true Palms, is inclined to retain several species of that genus. An article by Mr. N. Wilson on the Staple Products of Jamaica (Journ. of Bot. 1867, p. 276), was also read and discussed, and *Cæsalpinia Sappan*, and *Bœhmeria nivea*, strongly recommended for cultivation in Venezuela.

Mr. F. W. C. Areschoug, of Lund, forwards his 'Bidrag till den Skandinaviska Vegetationens Historia' (Contributions towards a History of the Scandinavian Vegetation), which treat of the fossil and existing floras of the Scandinavian peninsula.

Botanical Society of Edinburgh.—*Thursday, November* 14*th*, 1867.—Isaac Anderson-Henry, Esq., President, in the chair. The President delivered an address on the hybridization or crossing of distinct species of plants; and, in concluding, noticed the loss to the Society by the death of Professor Goodsir (*vide* Vol. V. p. 123), and of Alexander Bryson, a gentleman eminent in the scientific profession which he so long and so successfully followed in this city, and no less eminent in this Society for the prominent part which he took in its proceedings. The following communications were read:—

1. Observations on New Zealand Plants. By Dr. Lauder Lindsay. In this paper, the author refers exclusively to the flowering plants of Otago which are, for the most part, illustrative of the variations of the *individual* from the characters of the species, in relation, more particularly, to the limitation or definition of species. He also gives notes regarding their geographical distribution and economical applications, and their Maori and settlers' names.

2. Letter from Dr. Robert O. Cunningham, H.M.S. Nassau, Rio de Janeiro, to Professor Balfour:—

"*H.M.S. Nassau, Rio de Janeiro,*
"*October 4th*, 1867.

"My dear Sir,—We left England about the middle of last September, on our voyage to the Strait of Magellan, visiting on our way Madeira, St. Vincent in the Cape de Verde group, Rio de Janeiro, Monte Video, and Maldonado. I was delighted with the wondrous beauty of Madeira, and struck with the combination of European and subtropical characters exhibited by its vegetation; but I did not see nearly so much of the island as I would have liked, in consequence of our being placed in quarantine for five days out of the week

we remained there. St. Vincent, where we spent four or five days, interested me very much indeed,—partly because it constituted my first experience of land in the tropics, partly on account of its intensely volcanic character, and the peculiar and, to me, novel aspect of its plants. Here I saw shrubby *Euphorbias*, for the first time, in the uncultivated condition, and here also I made practical acquaintance with members of the Orders *Zygophyllaceæ*, *Cucurbitaceæ*, etc. The animals did not less interest me, for I met with *Mollusca*, *Crustacea*, corals, etc., with whose forms I had been long familiar from figures and descriptions. I was interested to find both the *Octopus* and *Aplysia* which Darwin describes in his account of the neighbouring island of St. Jago. I made a considerable collection of the plants of the island, but unfortunately lost nearly all of them in the process of drying; for the extreme heat of the weather, for the time, caused my health to suffer so much as quite to unfit me for work of any description, and consequently most of my specimens were destroyed by the damp atmosphere which one encounters at sea in the tropics. I have regretted this very much frequently since then, for I believe the vegetation of the island was much more abundant the season we visited it than is usually the case. We were all delighted, as you may suppose, with the glorious scenery of Rio, where we spent ten days; and we walked about as much as the excessive heat of the month of November would allow us. The profusion and variety of animal and plant life was something perfectly distracting, and seemed almost artificial, communicating a most strange feeling to one at first. The country in the neighbourhood of Monte Video is of a rather uninteresting cast, consisting, as you well know, of miles and miles of pampas, stretching away as far as the eye can reach, and clothed, for the most part, with a very tall-growing Thistle,* with a bluish flower, gorgeous in some places with a carpeting of scarlet and purple Verbenas. A handsome bluish-purple *Echium* also covered tracts in the neighbourhood of the town. We only spent a single day at Maldonado, which, however, was a remarkably pleasant one, employed by a party of us in taking a long ramble, in the course of which we met with a great variety of birds and plants. For the latter it appears to be a specially rich locality, and I was sorry we had not more time at our disposal to devote to it. We reached the Strait of Magellan on the 21st of December, and, with the exception of a short trip to the Falkland Islands to take in provisions and coal, remained there till the 12th of June, when we moved northwards, as the daily increasing severity of the climate necessitated a suspension of surveying operations for the season. All things considered, we were very fortunate during our stay on our ground, for though we encountered a certain amount of dangers and a very considerable number of difficulties, we met with no serious mishaps, enjoyed for the most part excellent health, and accomplished a respectable proportion of work. Excepting a short cruise of a few days in the western half of the Strait, when we were occupied piloting H.M.S. Zealous on her way to the Pacific, our time was spent in the *eastern* portion of the Strait, extending from the eastern entrance to the Chilian settlement of Sandy Point, which we made our basis of operations. It is impossible to imagine a greater contrast than that presented between the *eastern* and *western* sides of the Straits,—the land on both sides of the former being formed of low undulating plains, covered with wiry grass, but destitute of trees of any description for the most part, and the geology almost exclusively boulder clay; while that on the latter consists of high precipitous mountains, in many instances snow-capped, and here and there presenting glaciers dipping down to the water,—clothed with a vegetation of dense short impassible weeds, and abounding in metamorphic rocks. And the climate is equally different, for that of the eastern portion is dry, bright, and clear,

* Probably *Cynara Cardunculus*.

while that of the west abounds in rain and snow. Another peculiarity of the former consists in the great force and rapidity, and the great rise and fall, of the tides,—two circumstances which were greatly in our way in our work, as was also the prevalence of strong gales, which arose in the most unexpected manner and lasted for days and days at a time, making a heavy demand on our patience, as we were occasionally kept a week or ten days on board owing to the impossibility of dispatching boats on surveying work. I used frequently to accompany Captain Mayne and the surveying officers on their expeditions, and know no pleasanter kind of life than camping out for a few days at a time. There is certainly a most wonderful charm in landing on spots for the first time, and a delightful sense of freedom and also of uncertainty as to what we may have to encounter. I need scarcely say that I made use of every opportunity in my power to observe and collect specimens of the plants and animals of all the localities visited by us, and in consequence obtained a tolerable collection of the fauna and flora of the Strait. In making the latter I was greatly assisted by the 'Flora Antarctica' supplied to me at my request by the Admiralty.

"Some of the Strait plants were identical with old friends at home. Many of them were species new to me, and a considerable number belonged to genera which I had never a previous opportunity of examining. As examples of British plants that I met with in the Strait, I may instance *Sisymbrium Sophia*, *Cerastium arvense*, *Apium graveolens*, *Armeria maritima*, *Galium Aparine*, *Taraxacum Dens-leonis*, var. *lævigatum*, *Primula farinosa*, var. *Magellanica*, *Hippuris vulgaris*, *Cystopteris fragilis*, and *Botrychium Lunaria*. Most of these plants occur in tolerable abundance, *Apium graveolens* very copiously indeed. *Hippuris vulgaris* I have only obtained in one locality as yet, viz. a small stream running into Oazy Harbour on the Patagonian side of the Strait. I believe the only other recorded locality in the Strait is Port Famine, where Captain King procured it. *Cystopteris fragilis* is common in parts of the woods. *Botrychium Lunaria*, which Hooker mentions on the authority of Banks and Solander as occurring at Good Success Bay, in the South of Fuegia, I found three specimens of at the entrance of Oazy Harbour. Several of the *Algæ* are also, I believe, identical with British species. Thus, *Codium tomentosum* is common. I have found this *Alga* also in abundance in the harbour of Rio de Janeiro. As some of the plants of the Strait that interested me most, I may mention *Calceolaria plantaginea* and *C. nana*, *Bolax glebaria*, the *Myzodendrons*, which are so abundant on the Fagi, *Cœlonarchis Lessonii*, *Chloræa Magellanica*, *Embothrium coccineum*, *Sisyrinchium filiforme*, *Myrtus Nummularia*, *Fuchsia coccinea*,* *Callixine marginata*, *Philesia buxifolia*, and *Cyttaria Darwinii*. The *Myrtus*, *Callixine*, *Philesia*, and *Fuchsia* were met with at Port Gallant on our cruise to the westward with the 'Zealous.' I was charmed with the *Fuchsia* and the *Philesia*, and realized how much more I valued their exquisite beauty as they occurred in the Strait of Magellan than I would have done had I encountered them at a place like Rio, where there is such a prodigality of splendid flowers. The *Callixine* is also a lovely little thing, and deliciously sweet. I obtained specimens of it, and *Myrtus Nummularia*, also at the Falkland Islands, whose fauna and flora are very much the same as those of the Strait. One thing, however, struck me, and that was, that certain species which I saw at the Falklands I found in the damp woody districts of the Strait, not in the eastern district, which is so much more allied to the Falklands in its general characters. In addition to *Cystopteris fragilis* and *Botrychium Lunaria*, I obtained specimens of seven other species of ferns, —to wit, two species of *Hymenophyllum*, *Aspidium mohrioides*, *Asplenium Magellanicum*, a *Gleichenia* (I believe *G. acutifolia*), *Lomaria alpina*, and *L.*

* *F. Magellanica*, as Dr. Hooker has just shown.—Ed.

Magellanica. The latter enjoys a wide range, and appears subject to considerable variation. I have obtained specimens of it at Maldonado, the Falkland Islands, and at Port Gallant, and have seen Brazilian specimens of what I believe to be the same plant. At the Falkland Islands I saw no specimens with a caudex, but some of those at Port Gallant had a straight one about two feet high. Among the fungi that occurred to me were species of *Agaricus* (the common mushroom grows abundantly in many localities, on both sides of the Strait), *Polyporus*, *Tremella*, *Clavaria*, *Geastrum*, etc. I got a good many fine lichens, and expect to get many more in succeeding seasons. We arrived at Rio on the 1st of July, and expect to leave it in the course of a few days for the Strait, calling at Monte Video on our way. I hope while we are there to get up the river to Buenos Ayres, to see Burmeister and the Museum. I have enjoyed the three months we have spent here very much, but am very glad at the prospect of our return to the Strait, as the climate here is very enervating. The country is, however, splendid beyond description. As regards plants, I have been specially struck with the great variety and profusion of palms and ferns, and my attention was greatly arrested at first by the *Lygodia*, and other twining ferns, so different in habit from our British ferns. Despite the heat, I have walked about a great deal, and have made one or two excursions to places at some distance. Soon after our arrival here, I made the acquaintance of a most kind and hospitable Scotchman, Dr. Gunning, whose name I have no doubt you are familiar with, as an old Edinburgh man; and I have made two visits to him at his house on the Sierra de Mar, about fifty miles from Rio, and saw some splendid illustrations of virgin forest. Our work this next season will be partly in the completion of the eastern portion of the Strait, partly in the survey of Smyth's Channel; and we will winter next year at Valparaiso or Concepcion."

2. Notice of Mussana Bark (*Albizzia anthelmintica*) from Abyssinia, by Henry Hunter Calvert, British Vice-Consul, Alexandria. Mr. Calvert sent specimens of Mussana (or Mussenna) bark, supposed by Brongniart and some other authors to be the produce of *Albizzia anthelmintica*, a plant belonging to the *Mimosæ* section of the Natural Order *Leguminosæ*. The bark has the reputation in Abyssinia and Sennaar of being a specific as a *tænifuge*, for which purpose two to four ounces powdered are made into an electuary with honey. Mr. Calvert stated that he was indebted for the information he sent to Dr. Abbate, a gentleman who had travelled a great deal in Upper Egypt and Nubia, and to Dr. Guillardot, who has done much towards the exploration of the Syrian flora.

4. Letter from Mr. Robert Brown, of the Greenland Scientific Expedition.

"*Copenhagen*, *October* 25*th*, 1867.

"Dear Sadler,—I have made, in little more than two months, a collection of Greenland plants amounting to more than 5000 specimens, including a fine lot of Mosses (in fruit), Lichens, *Hepaticæ*, a few *Fungi* and *Algæ*, marine and freshwater. In addition to these, I made a good collection of skulls, skeletons, etc., of seals and whales, and birds, fishes, insects, *Annelidæ*, *Mollusca*, *Echinodermata*, Zoophytes, etc, and a large collection of diatomaceous gatherings. We have also brought home about a boat-load of fossil plants, with observations and sections of the deposits. In addition to this, I have made several hundred astronomical observations for the latitude and longitude of the places we visited. When I tell you that all this, with scarcely an exception, was done by myself, besides doing a fair share of the rest of the work of the expedition, you can conclude that time did not lie heavy on my hands, and that I will have work enough this winter."

Under the title of 'Herbarium meist seltener u. kritischer Pflanzen Nord- und Mitteldeutschlands,' Mr. C. Bænitz, of Kœnigsberg, Prussia, has issued

two fascicles of dried plants of North and Central Germany (price of the two, £1. 4*s.* 6*d.*), which deserve to be warmly recommended, and contain the following species, viz.: — 1–83. Achillea cartilaginea, *Led.* Æthusa Cyn. v. segetale, *Bœn.* Agrostis alba v. gigantea, *Gaud.*; maritima, *G. F. Mey.* Aira Wibeliana, *Sond.* Alectorolophus fallax, *Wim.* Ammophila arenaria, *Lk.*, *Bb.*; Baltica, *Lk.* Anthyllis Vulneraria v. maritima, *Schwg.* Andropogon Ischæmum. Avena fatua, planiculmis, *Schrad.* Brachypodium silv. v. villosum, *Br.* Bromus serotinus, *Ben. Br.*; racemosus. Bulliarda aquatica, *DC.* Calamagrostis Epig. v. Hübneriana, *Rch.* Carex Buxbaumii, *Whlbg.*, *Gr.*; Davalliana, *Sm.*; cæspitosa, *L. Dr.*; cyperioides, *Gr.*; digitata; elongata; ericetorum, *Poll. Bb.*; fulva, *Good*; Ligerica, *Gay*, *Br.*; nutans, *Host.*; Schreberi v. curvata, *Knaf. Br.*; stricta, *Good.*; tomentosa. Centaurea Austriaca, *Willd.* Chærophyllum aromaticum. Chamomilla discoidea, *Gay.* Cladium Mariscus, *R. Br.*, *Sf.* Corispermum interm., *Schwg.* Crepis biennis. Dentaria enneaph., *Gr.* Diplotaxis tenuifol. *DC.* Elssholzia Patrini, *Grcke.* Empetrum nigrum, *L. c. fr.* Epipactis rubiginosa, *Crntz.* Erica Tetralix, *Gr.* Festuca elat. v. adscendens, *Retz.*; rubra v. arenaria, *Osbeck*; silvatica, *DC.* Galinsogea parvifl., *Cav.* Galium ochroleucum, *Wlf.* Gladiolus imbricatus, *Gr.* Glyceria distans, *Whlbg.*; remota, *Fr.* Gnaphalium luteo-album, *Sf.* Heleocharis acicularis, *R. Br.*; ovata, *R. Br.*, *Gr.* Heracleum elegans, *Jacq.*; Sibiricum. Hierochloa odor., *Whlbg.* Hippuris vulgaris, *Sf.* Honckenya peploides, *Ehrh.* Juncus alpinus, *Vill.*, *Gr.*; Balticus, *Willd.*; filiformis; maritima, *Lam.*; Tenagea, *Ehr.*, *Gr.*; tenuis, *Willd.*, *Gr.* Lamium hybridum, *Vill.*; intermedium, *Fr.* Lappa macrosperma, *Wallr.*; tomentosa v. alba. Laserpitium prutenicum. Lemna gibba. Leucojum vernum, *Sf.* Luzula albida v. rubella, *Hoppe*; maxima, *DC.* Linaria odora, *Chav.* Matricaria Chamomilla. Melandryum noctifl., *Fr.* Mentha Pulegium. Milium effusum, *Barby.* Myosotis variabilis, *Angelis.* Myrica Gale, Nepeta racemosa, *Rch.*, *qu. sp.* Omphalodes scorpioides, *Schrnk.*, *Sf.*—84–170. Panicum sanguinale. Papaver Rhœas. Paris quadrif. Pinus obliqua, *Sauter*; *Gr. c. fr.* Pisum maritimum, *fl. c. fr.* Poa compr. v. Langeana, *Rch.*; nemor. v. firmula, *Gaud.*, *Gr.* Polygonum mite, *Schrnk.* Pulmonaria ang., *Sf.* Pulsatilla patens; pratensis vernalis, *Mill.*, *Dr.* Ranunculus Cassubicus, aquat. v. paucistamineus, *Tsch.* Rubus Chamæmorus, mas. et fem. Sagina apetala, *Sf.* Salix Lapponum, fem.; pentandra, fem. mas. et fol., *Gr.*; Starkeana, *Willd.*, mas. fem. et fol.; Starkeana repens, fol. aurita; Starkeana, fem. et fol.; nigricans, *Fr.*; repens; viminalis, fem. Scirpus cæspitosus; fluitans; silvaticus v. ramosus; silvaticus; radicans, *Gr.*; radicans, *Schk.*, *Gr.* Schœnus ferrugineus, *Lm.*, *Bb.* Senecio barbara, *Krck.*; vernalis, *W. K. Bb.* Solanum Dulcamara v. biauriculatum. Stellaria Frieseana, *Ser.* Thlaspi alpestre. Tragus racemosus, *Desf.* Tragopogon heterosperm., *Schwg.* Triticum acutum, *DC.*; junceum; strictum, *Deth.* Urtica dioica v. microphylla. Vaccinium Oxycoccos, *Gr.* Viola palustris. Aspidium lobatum, *Sw.*, Asplenium Adiantum-nigrum; alpestre, *Mett.*; septentrionale, *Hoff.*, *Gr.*; Trichomanes, *Gr.* v. incisum, *Bernh.*, *Gr.* Botrychium Lunaria, f. normalis, *Röper*: f. subincisa, *Röper*; ovatum, *Milde*; f. monstros. Botrych. Matricariæ f., *Al.*, *Br.*; subintegrum, *Milde*; normalis; compositum, *Milde*; monstros. Botrych. simplex, *Hitsch.* v. incisum, *Milde*; subcompositum, *Lasch*; compositum, *Lasch.* Cystopteris frag. v. anthriscifolia, *Rth.*; Sudetica, *Al.*, *Br.* Equisetum hiemale, *Bb.*; maximum, *Lmk.*, *Gr.* Lycopodium inundatum, *Gr.* Ophioglossum vulgatum, *Dr.* Phegopteris polypodioides, *Fée*, *Sf.* Pilularia glob., *Gr.* Polystichum cristatum, *Rth.*, *Sf.*; Filix-mas v. incisum, *Dœll.*, *Gr.*; Oreopteris, *DC.*, *Sf.* Polypodium vulgare v. commune rotundatum; attenuatum; auritum. Salvinia natans, *All.* Struthiopteris Germanica, *Willd.* Chara ceratophylla, *Wllr.*; fœtida, *Sf.*; hispida. Nitella capitata, *Nees*, *Gr.*; flexilis, *Ag.*, *Gr.* v. subcapitata, *Al.*, *Br.*, *Gr.*; gracilis, *Ag.* v. elongata; brevibracteata, *Gr.*

Worthington G. Smith, Del. et Lith.

F. Waller, Imp 18 Hatton Garden

REPORT OF THE LONDON BOTANICAL EXCHANGE CLUB FOR THE YEAR 1867.

By the Curators.

Ranunculus heterophyllus, "Fries," Bab. Mr. Bailey sends from Mobberley, Cheshire, a *Batrachian Ranunculus*, which seems to be this plant, though it has also points of resemblance to *R. floribundus*, Bab.

Papaver Lecoqii, Lamotte. Mr. Bromwich contributes specimens from Ashorne, Warwickshire.

Lepidium latifolium, L. Specimens with mature fruit of this species are sent by Mr. Syme. He says they are very rare in herbaria.

Cardamine impatiens, L. A small copse by Cosford House, near Thursley, Surrey; H. C. Watson. A new locality for a plant very scarce in the South of England.

Sisymbrium Sophia, L. Botley, Berks; W. T. Dyer. Additional to sub-province 9 of Cyb. Br. Supp.

Polygala ciliata, Lebel. (See last Report.) Mr. Syme writes, "Mr. Watson and myself have this year each gathered a ciliated specimen of *P. eu-vulgaris;* Mr. Watson at Compton, and myself at Box Hill; so, no doubt, *P. ciliata* is not a variety, but only a form of other species or varieties."

Ulex Gallii, Planch. Sent from Ferningale Common, Warwickshire, by Mr. Bromwich.

Rosa Hailstoni, Baker. Mr. J. G. Baker distributes from the neighbourhood of Thirsk a stock of specimens of a *Rosa* of the *canina* group, with the following characters:—General habit and mode of growth of typical *canina*. Prickles moderately close and numerous, the large ones like that of typical *canina*, but passing down gradually on the barren shoots into small slender aciculi. Leaves bright green and naked above, paler and quite naked beneath, the terminal one ovate, rounded at the base, the serration rather open and irregular and a few of the teeth slightly toothed again, the petiole not at all hairy but slightly setose, furnished with 3 or 4 falcate aciculi. Stipules naked on the back, closely setoso-ciliated. Flowers 3 or 4 in a cluster when luxuriant, the pedicels rather short, quite naked, the calyx-tube obovoid or roundish, quite naked, the sepals fully pinnate and leaf-pointed, erecto-patent after the pale pink petals fall, naked on the

back, slightly hairy towards the edge, slightly setoso-ciliated, falling by the time the fruit has become scarlet, which is late in September. Styles hairy. By the passage down of its prickles into small slender aciculi, this recedes from *canina* in the direction of *Hibernica*. Of named forms it is nearest the French *R. Schultzii-Bipont.* (Déségl. Monogr. p. 66), which has similar prickles in combination with roundish leaflets, almost unarmed slightly hairy petioles, a small round fruit, which ripens very early, and subpersistent, sparingly pinnate sepals. There is a specimen of a similar plant without any indication of locality among the British Roses of the late Mr. Hailstone, of Bradford, who paid great attention to the genus for many years, though he never published the results of his investigations.

Rosa systyla. Sent by Mr. W. Richardson from the neighbourhood of Alnwick, Northumberland. This extends considerably the northern limit of the species in this country, as it was not clearly known beyond Worcester.

Agrimonia odorata, Mill. One large plant found by the side of a private road, south of Virginia Water Station, Surrey; H. C. Watson. New to the county.

Epilobium roseum, Schreb. A garden weed, Manchester; Dr. Windsor. New to sub-province 21 of Cyb. Br. Supp.

E. lanceolatum, Seb. In three lanes leading out of Bowler Green, between Witley Station and Thursley, Surrey; H. C. Watson. The species is now extinct in the only locality given in the Surrey Flora. This new locality restores it to the flora of the county.

Valeriana officinalis, L. Mr. Watson contributes a series of specimens from five different localities in Surrey, sent in order to illustrate the two subspecies or varieties *Mikanii* and *sambucifolia*. He says, "*V. sambucifolia* is the prevailing form in Surrey, and probably in almost all other counties of Britain. *V. Mikanii* is distinguished by its leaflets being usually more numerous, narrower, and less dentate, but as it passes from the firm ground of coppices and hillsides into adjacent dug or disturbed ground, the leaflets decrease in number and increase in width and dentation until they equal those of *sambucifolia*, as it occurs in deep bogs or watery ditches. Roots and fruit are alike in both."

Barkhausia taraxacifolia, DC. Near Plymouth; T. R. A. Briggs. Additional to sub-province 2.

Arctium eu-minus, Syme, E. B. Mr. Briggs sends this from Elburton, Devon.

Senecio squalidus, L. A variety sent from Jericho, near Oxford, by Mr. Dyer. In this plant the flower-heads are exactly one-half the normal size, *i. e.* ½ inch instead of 1 inch across, whilst the foliage is very slightly smaller than usual. The dried specimens have very much the appearance of the rayed form of *S. vulgaris*, L. Mr. Dyer proposes the name *parviflorus* for this variety. It grew sparingly amongst thousands of the normal form.

Pyrola minor, L. A wood near Brook Street, between that place and Bowler Green, S.W., Surrey; H. C. Watson. A new locality.

Linaria vulgaris, Mill. A monstrous or abnormal form gathered by Mr. Watson near Virginia Water Station, Surrey. The following is his description of the flower:—"The calyx is normal, or nearly so. The corolla is replaced by five other sepals, alternating with those of the calyx, less uniform, mostly rather narrower and longer. Within the second calyx, or metamorphosed corolla, are one to four stamens, distorted, very imperfect, with abortive anthers. The style is a hollow cylinder, open at the top, where the stigma ought to be; in the lower flowers it is much like the ordinary style, except in being shorter and thicker; in the upper flowers, gradually becoming more inflated, so as rudely to resemble an imperfect corolla, of a yellowish-green colour, partially split open, and divided into narrow segments, two to four (or perhaps five in some instances), which are evidently prolongations of the carpels, bearing axillary ovules within their bases. The general aspect or first glance at the raceme suggests the idea of a *Reseda* rather than that of a *Linaria*. There was one straggling patch of the plant on a hedgebank, the green racemes protruding through other herbage, and sufficiently near together to render it probable that all came from a single root which had spread by its creeping suckers. Plants with flowers of the normal form were in close vicinity. Each individual specimen of the aberrant monstrosity will not exactly correspond with the above description,—in some of them, the styles being more corolla-like, in others, being more split open and less cylindrical, etc."

Mentha piperita, Huds. Subspontaneous, at Boar's Hill, Berks, near Oxford; collected by Mr. Dyer. Not recorded for sub-province 9 in Cyb. Br. Supp.

M. sativa, L. Mr. Briggs sends from near Plymouth specimens

of the following subspecies and varieties:—*M. paludosa*, Sole, *M. cardiaca*, Baker, and *M. gentilis*, L.

Calamintha menthifolia, Host, var. *Briggsii*, Syme. The same contributor sends specimens of the plant named after him by Mr. Syme. It seems a slight variety only, differing from the type in its larger size, longer peduncles, and more hairy stems and leaves.

Myosotis repens. Sent by Mr. Parker from Mochtry, Montgomeryshire. New to sub-province 18 of Cyb. Br. Supp.

Chenopodium album, L. An interesting series is contributed by Mr. Watson of this species to illustrate the three varieties, *candicans*, *viride*, and *virens*, given in the Lond. Catalogue. "The name *paganum*, adopted by Syme in E. B. iii., is probably applied to the same variety as *virens*, but the authors of the 'Flore de France' make it synonymous with *viride*," Watson. Mr. W. sends what he thinks "intermediate links" between the varieties, but whether they be so in any true sense is to be doubted. As far as experiments have yet gone, they tend to show that these forms come up true from seed.

Atriplex erecta (Huds.?), E. B. Mr. Syme and Mr. Dyer both send specimens of this plant, collected at Twickenham, Middlesex. The former writes, "In spite of the perianth being usually smooth or but slightly muricated, I believe this to be the plant of Smith and probably of Hudson. The murication or smoothness of the perianth is not a constant character; it varies in seedlings from one parent-plant of *A. patula*, *angustifolia*." In the Lond. Catalogue this plant is placed as a variety of *A. hastata*, L., but in the new edition of Eng. Botany it stands under *A. patula*, L. It is better so placed, for though it has some characters approximating it to *A. deltoidea*, Bab., yet, from the shape of the leaf, it must be considered closer to *A. angustifolia*, Sm. The *A. erecta*, "Huds.," of Bab. Man. and other English authors, is called *A. serrata* by Syme. It is a very common cornfield plant. A few specimens are sent by Mr. Syme for comparison with *A. erecta*.

Polygonum "*mite*." Some specimens from Llanbrynmair, Montgomeryshire, C. Eyre Parker, were sent out under the above name. It should have been altered to *P. Hydropiper*. Correspondents who received any specimens from the above locality are requested to alter the label.

P. littorale, Link. Handsome specimens of this subspecies of *P.*

aviculare, L., are sent by Mr. Briggs from Wembury, Devon. The plant has much the look of *P. Raii*, Bab., but is a greener plant, with a smaller nut, which is not polished as in that species.

Rumex pratensis, M. and K. Near Boar's Hill, Berks; W. T. Dyer. Additional to sub-province 9 of Cyb. Br. Supp.

Euphorbia Lathyris, L. Said to be "completely naturalized" at Frodsham, Cheshire; J. T. Robinson.

Salix undulata, Ehrh. This appears to be the commonest Willow upon the banks of the Thames in the neighbourhood of Richmond, both upon the Middlesex and Surrey banks. Mr. Baker has contributed a supply of specimens. It is also common on the Middlesex shore, even as far down as Chelsea, whence Dr. Trimen sends specimens.

Salix Grahami, Borrer. Mr. Baker has called attention to a plant found in Sutherlandshire by the late Professor Graham, and preserved in Mr. Borrer's herbarium at Kew, with the above name in MS. (See 'Journal of Botany,' Vol. V. p. 157, and tab. 66.) Botanists in the north will do well to examine apparent varieties of *S. herbacea*, with a view to the refinding of this species.

Iris acoriformis, Bor. With a few specimens collected at Greenwich, Kent, and so named; Mr. Syme writes, "This is the only one of Boreau's three forms of *Iris pseud-acorus* that I have seen by the Thames, along which river it extends to my knowledge from Streatley, Berks, downwards. The *I. pseud-acorus*, Bor., I have in my garden, the root was brought from Deal. Of the *I. Bastardi*, I have seen but one British specimen, from Lord Mansfield's fishponds near Highgate."

Allium carinatum, L. (See 'Journal of Botany,' Vol. V. p. 314.) This well-marked species is recorded from Nottinghamshire, where it was discovered in August, last year (1867), by the Rev. W. S. Hampson, between Brandon and Doddington, near Newark, amongst coarse grass and rushes. The following description is taken from Grenier and Godron's Fl. Fr. vol. iii. pp. 207-8:—"Bulb simple, ovoid, greyish. Stem $1\frac{1}{2}$ to 2 ft. high, straight or slightly flexuose, cylindrical, leafy up to the middle. Leaves upright or ascending, linear, fleshy, *flat upwards*, slightly channelled below, almost smooth or a little furrowed beneath, not keeled, scabrous on the edges. Umbel many- or few-flowered with many or few bulblets.

Spathe with two unequal lanceolate-acuminate valves, the larger one exceeding the umbel. Perianth campanulate, rose- or deep violet-purple, the outer segments very concave and carinate. Stamens *exserted, one-third or half as long again as the perianth;* anthers yellow. Style longer than the stamens; angles of the ovary asperous." Synonymy:—*A. carinatum*, L. Sp. 426; DC. Fl. Fr. iii. p. 220. *A. violaceum*, Willd. *A. flexum*, W. and K. Rar. Hung. t. 278. *A. flexuosum*, Hochst. The plant is well figured in Waldstein and Kitaibel, l. c., and in Redouté, Lil. vii. 368, also in Reichenbach's Ic. Flor. Ger. vol. x. tab. 482–3, nos. 1058–59 (*violaceum*, W., and *asperum*, Don); 1057 (*carinatum*, L.) must be quoted doubtfully. There are specimens in Billot, Exsicc. 1163.

The species is found throughout Central Europe; also in Belgium, Denmark, and Gothland, and in North Italy (Venice), Turkey, and Central and Southern Russia.

A form of the plant, without bulbs and capsuliferous, is often made a species under the names *A. montanum*, Sibth., *A. pulchellum*, Don, *A. paniculatum*, Reich. (not Linn. or DC.). It is figured in Reich. Ic. Fl. Ger. x. 483–4, nos. 1060–61, and Redouté, Lil. v. 252. Specimens from Lyons are in Billot, Exsicc. 671.

The "*A. carinatum*, L.," of Smith, E. B. 1658, is nothing more than a broad-leaved, large form of *A. oleraceum*, L. It has included stamens and greenish or yellow flowers, and is quite distinct from the species we are considering.

Potamogeton decipiens, Nolte. (See last year's Report.) Mrs. Hopkins has contributed some more specimens of this from Bath. Flowers and fruit, however, are still desiderata.

P. rufescens, Schrad. Specimens from between Woking and Chobham are sent by Mr. Watson, who suggests that the "*P. prælongus*" of the Surrey Flora may be a misnomer, this species being intended.

Ruppia maritima, L. With examples of this, collected by Mr. Syme, he writes, "It seems to be later in flowering than *R. rostellata*, which grew with it, as it was in flower while *R. rostellata* was in seed. The peduncles of *R. maritima* elongate before flowering and rise out of the water, the flowers being often an inch or more above the surface. I have not seen this in *R. rostellata*."

Wolffia arrhiza, Wimm. Dr. Trimen sends plants collected this year at Staines, where it is still abundant, though apparently confined to a single piece of water.

Typha angustifolia, L. Lopwell, Devon; T. R. A. Briggs. Additional to sub-province 2.

Cladium Mariscus, Br. Sent by Dr. Trimen from Penally, Pembrokeshire. Additional to sub-province 17, of Cyb. Br. Suppl.

Scirpus glaucus, Sm. This usually maritime plant is sent from two inland stations. Mr. Bromwich contributes it from a marsh near Itchington Holt, Warwick (new to sub-province 14), and Mr. Fox, from a pond at Mitcham, Surrey. Though placed in the London Catalogue as a variety of *S. lacustris*, L., it seems to come very near to *S. carinatus*, Sm., from which, indeed, it is not easy to find good distinguishing characters. The glumes of *S. glaucus* have indeed more rough points upon them than those of *S. carinatus*, as found by the Thames, but the glumes of the latter are by no means smooth as Koch states. Babington says that the lower bract overtops the panicle in *S. carinatus*, but this character does not hold good.

Carex incurva, Lightf. Gathered this year on the sandy shore of Holy Island, off the coast of Northumberland, by Mr. Ralph Tate. It has not been recently collected south of Forfarshire and Kincardine.

Gastridium lendigerum, Gaud. In 1867, very abundant in a field of wheat, near the school-house, at Oxshott. Rare and inconstant in North Surrey; H. C. Watson.

Arundo stricta, Schrad. Mr. Robinson states that Oakmere, Cheshire, where this grows, is about 550 feet above sea-level. The altitude is omitted in Cyb. Brit.

Bromus serotinus, Beneken. We are favoured with a communication from Herr von Nechtritz, of Breslau, pointing out that a plant sent to him from England, under the name of *Bromus asper*, gathered by Mr. Charles Bailey, near New Mills, in Derbyshire, must be referred to the *B. serotinus* of Beneken, which is regarded as a distinct species by several recent German authors. The characters relied upon as distinctive, are :—

B. asper. Lower sheaths and leaves shortly and stiffly hairy ; upper ones naked or nearly so ; lower branches of the panicle in from threes to sixes.

B. serotinus. All the sheaths and leaves densely clothed with longer hairs ; lower branches of the panicle only two and far apart.

Descriptions will be found in Wirtgen's 'Flora of the Rhine Province,' and Von Garcke's 'Flora of Northern and Central Germany,'

and a specimen of *B. serotinus* is in Wirtgen's 'Fasciculus of Critical Plants;' but the characters are of very slight value, and, looking over our specimens, we do not find that the form subglabrous upwards has invariably the larger number of branches. Specimens gathered near Thirsk, North-east Yorkshire, by Mr. Baker, belong also to *B. serotinus.*

Lastrea Thelypteris, Presl. In one spot, close by the side of the Basingstoke canal, between Frimley Green and Pirbright, Surrey; H. C. Watson. The rhizomes float in the water of the canal.

Chara flexilis, L. We wish to invite the attention of our members to the question of the distribution in this country of *C. flexilis* and *C. syncarpa.* The two species agree almost precisely in general habit, but the former is monœcious, and the latter diœcious. We believe it will be found, contrary to what seems to be the ordinary idea, that *C. syncarpa* is a common plant and *C. flexilis* quite a rare one.

British Tolypellæ.—The British *Characeæ*, of the section *Tolypella*, need revising as regards their arrangement and nomenclature. In the first place, Dr. Alexander Braun, whose long-continued studies of the Order render his dicta of the highest authority upon all points connected with it, identifies the *Chara Borreri*, of Babington, with a plant (*Chara prolifera*, Ziz.) which both he and Kützing regard as a robust variety of the plant called by Babington *C. polysperma.* In corroboration of this identification, he sends specimens from Basle which manifestly coincide with Borrer's own specimens of the plant on which *C. Borreri* was founded. For *C. polysperma*, it now appears (see Braun and Rabenhorst's 'Fasciculus of Dried Specimens of the European *Characeæ*,' n. 18) there are two names of earlier date, viz. *C. intricata*, Roth (Catal. Fasc. i. 125), which goes back to 1797, and *C. fasciculata*, Amici (Descr. p. 16), imposed in 1827. From the other species of the group this is distinguished by its larger size and branchlets, with more or less distinctly pointed tips. Dr. Braun identifies the plant called *prolifera* by Babington (see Charac. Exsicc. n. 17) with *C. glomerata*, Desv. in Lois. Not. p. 135 (date 1810). To this he refers a plant, gathered in Anglesea (Llyn Coron), in Borrer's herbarium. *C. glomerata* appears to be very closely allied to the true *nidifica*, but to be a smaller plant, with shorter branches and fewer articulations. To *C. glomerata* he refers Babington's *C. Smithii* as a doubtful synonym. This point cannot be settled till it is regathered,

and the question of whether it be really diœcious investigated upon a good range of living specimens. All the other *Tolypellæ* are monœcious; and as all our other British *Characeæ* are now shown to be identical with plants known upon the Continent, it is a point of considerable interest to ascertain if we have really a distinct species here. A plant gathered many years ago by Dr. Moore in Lough Neagh, and suspected by him at the time to be the true *nidifica*, of the 'Flora Danica,' may not unlikely prove to be really so. It has been submitted to Dr. Braun for his opinion, and his reply is, "Habitus et folia omnino *nidificæ*, sed seminibus minoribus magis contortis accedit ad *C. fasciculatam* (*intricatam*)." We can, therefore it seems, only rely, with confidence, upon two British species, which should be called *intricata* and *glomerata*, and there are two others (*nidifica* and *Smithii*) which may prove distinct, but which must be left over for further investigation. We give the diagnosis of *nidifica* and the two accepted ones, from Kützing's 'Species Algarum,' with a few synonyms.

1. *C. intricata*, Roth; "mediocris, semilinea crassa, ramis verticillorum articulatis, ad genicula inferioria ramulifera, ramulis infimis furcatis elongatis multiarticulatis, apice subtiliter apiculatis, verticillis fructiferis dense aggregatis, spermatiis in axillis verticillorum et geniculis ramorum inferioribus dense conglomeratis, perispermio pellucido, a latere 13-striato. Monoica."—Roth, Catal. Fasc. vol. i. p. 125. *Nitella intricata*, Ag. Syst. Alg. p. 122; Billot, Fl. Exsicc. 1393; Rabenhorst, Dec. Alg. p. 68; Braun, Rabenh., Stiz. Char. Exsicc. n. 18. *C. fasciculata*, Amici, Descriz. p. 16. t. 5. f. 3. *Nitella fasciculata*, A. Braun, Schw. Char. p. 11; Kütz. Sp. Alg. p. 517. *C. polysperma*, A. Braun, Flora, 1835, p. 56; Bab. Man. edit. 6. p. 448. *Nitella polysperma*, Kütz. Phyc. Gen. p. 318.

β. robustior, Kütz., ramis verticillorum sterilium indivisis.—*Chara prolifera*, Ziz.; A. Braun, Flora, 1835, p. 56, non Bab. Man. edit. 6. 447. *Nitella prolifera*, Kütz. Phyc. Germ. p. 255. *C. Borreri*, Bab. Man. l. c.

2. *C. glomerata*, Desv.; "parvula, fruticulosa, ramis verticillorum sterilium simplicibus elongatis, plerumque 3-articulatis, fertilium conglomeratis, 4-articulatis, ad genicula infima 3–4 ramulis lateralibus brevioribus 3-articulatis instructis, apicibus obtusis; spermatiis aggregatis in axillis verticillorum vel in geniculo infimo ramorum, minutis, obsolete striatis. Monoica."—Desv. in Lois. Not. p. 135. A. Braun,

Flora, 1835, p. 55. *Nitella glomerata*, Kütz. Sp. Alg. p. 517; Coss. et Germ. Atlas, t. 41; Rabenhorst, Dec. Alg. 459; Braun, Rabenh. Stizenb. Char. Exsicc. n. 17. *C. prolifera*, Bab. Man. edit. 6. p. 447.

3. *C. nidifica*, Roth; a caule subdichotomo crassiusculo, firmo, spithamæo vel pedali, ramis verticillorum articulatis, simplicibus, senis, verticillis fructiferis dense conglomeratis, ramis fructiferis elongatis 6–7-articulatis curvatis confervaceis attenuatis, apice obtusis, spermatiis globosis in geniculo infimo vel solitariis vel glomeratis, ramulis quaternis 3-articulatis tenuioribus incurvatis involucratis."—Roth, Catal. vol. ii. p. 126. *Conferva nidifica*, Müller, Fl. Dan. t. 761. *Nitella nidifica*, Agardh, Syst. Alg. p. 125; Kütz. Sp. Alg. p. 517; Braun, Rabenh. et Stizenb. Char. Exsicc. n. 32. *C. Stenhammariana*, Wallm. Ap. Liljebl. Sv. edit. 3. p. 686; Fries, Herb. Norm. vol. xv. n. 100. *Nitella Stenhammariana*, Wallm. Char. p. 43; Hartm. Scand. Fl. edit. 6. p. 239.

Additions to the Flora of the South Severn Sub-province, noticed in Gloucestershire, by Dr. St. Brody.

Ranunculus Baudotii, *Godr.*
R. fluitans, *Lam.*
Silene noctiflora, *L.*
Sagina ciliata, *Fries.*
Lactuca virosa, *L.*
Arctium majus, *Schk.*
Utricularia neglecta, *Lehm.* (See Journ. Bot. Vol. V. p. 279.)
Chenopodium ficifolium, *Sm.*
Potamogeton compressus, *L.*
Juncus cœnosus, *Bich.*

Additions for Sub-province 9, West Thames, noticed in Buckinghamshire, by James Britten.

Ranunculus heterophyllus, *Fr.*
R. floribundus, *Bab.*
R. peltatus, *Fr.*
R. Drouetii, *Schultz.*
R. trichophyllus, *Chaix.*
Papaver Lecoqii, *Lam.*
Arenaria leptoclados, *Guss.*
Hypericum elodes, *L.*
*Geranium sanguineum, *L.*
Vicia gracilis, *Lois.*
V. lathyroides, *L.*
Epilobium obscurum, *Schreb.*
Hieracium murorum, *L.*
Campanula Rapunculus, *L.*
Vinca minor, *L.*
Cuscuta Trifolii, *Bab.*
Verbascum virgatum, *With.*
Scutellaria minor, *L.*
Myosotis repens, *Don.*
M. collina, Hoffm.
Epipactis latifolia, "*All.*"
Habenaria bifolia, "*Br.*"
Polystichum angulare, *Newm.*
Lastrea spinulosa, *Presl.*

Exotic and Introduced Species.

Lepidium perfoliatum, L. Gloucester. Dr. St. Brody.

Camelina sativa, Crantz; *C. fœtida*, Fries; *C. sylvestris*, Fries. The first abundant, the two latter sparingly, in waste ground, near the docks, Gloucester. Dr. St. Brody.

Erysimum repandum, L. Gloucester. Dr. St. Brody.

Sisymbrium Irio, L. Oxford, by the Cherwell. W. T. Dyer.

Agrostemma coronaria, L. On a rock, by the canal, Llanrochairn, Montgomeryshire. C. E. Parker.

Impatiens parviflora, De Cand. An ineradicable weed in the Oxford Botanic Gardens. W. T. Dyer.

Vicia villosa, L. Gloucester. Dr. St. Brody.

Œnothera biennis, L. Railway banks, St. Vincent's Rocks, Bristol. Dr. St. Brody.

Claytonia alsinoides, Nutt. In great abundance in a wood at Ince, Cheshire. J. T. Robinson.

C. perfoliata, Don. Stowmarket, Suffolk. C. E. Parker.

Carum Carui, L. Gloucester. Dr. St. Brody.

Anthriscus Cerefolium, Hoffm. Oxford. W. T. Dyer.

**Hieracium amplexicaule*, L. This is stated by Mr. Syme to be "naturalized on Magdalen College walls, Oxford." Mr. Dyer and Mr. Boswell both send specimens. It has been cultivated in the Botanic Gardens, and, like many other plants there, is now left to itself, and comes up every year on the old garden walls, but does not spread.

Centaurea Jacea, L. Meadow at Twickenham, Middlesex. W. T. Dyer. The forms *α. genuina*, and *β. vulgaris*, of Koch, are both found there.

C. Melitensis, L. Gloucester, not uncommon. Dr. St. Brody.

Xanthium spinosum, L. Hereford. A. Ley.

Cuscuta Hassiaca, Pfeif. On Lucern, near Cambridge Railway Station. H. E. Fox and M. A. Lawson.

Echinospermum Lappula, Lehm. Docks, Gloucester. Dr. St. Brody.

Chenopodium opulifolium, Schrad. Apperton, Middlesex. Dr. Trimen.

Setaria glauca, Beauv., and *Panicum capillare*, Retz. Gloucester. Dr. St. Brody.

Sclerochloa dura, Beauv. Ballast, Hartlepool. M. A. Lawson.

Bromus patulus, Reich., and *B. tectorum*, L. Gloucester. Dr. St. Brody.

B. arvensis, L. Teddington, Middlesex. W. T. Dyer.

CORRIGENDA IN LAST YEAR'S REPORT.

Under *Sedum purpureum*, "Miss Gifford" *should be* "Miss Edmonds." In the List of Exotic and Introduced Plants, "*Barkhausia fœtida*, DC.," is a mistake for *B. setosa*, DC.

J. G. BAKER.
HENRY TRIMEN.

February, 1868.

ON THE NATURE OF THE DISCOLORATION OF THE ARCTIC SEAS.

BY ROBERT BROWN, ESQ., F.R.G.S.

(*Read before the Edinburgh Botanical Society, December* 12, 1867.)

The peculiar discoloration of some portions of the frozen ocean, differing in a remarkable degree from the ordinary blue or light green usual in other portions of the same sea, and quite independent of any optical delusion occasioned by light or shade, clouds, depth or shallowness, or the nature of the bottom, has, from a remote period, excited the curiosity or remark of the early navigators and whalemen, and to this day is equally a subject of interest to the visitor of these little-frequented parts of the world. The eminent seaman, divine, and *savant*, William Scoresby, was the first who pointedly drew attention to the subject, but long before his day the quaint old searchers after a North-west Passage "to Cathay and Zipango" seem to have observed the same phenomenon, and have recorded their observations, brief enough it must be acknowledged, in the pages of 'Purchas—His Pilgrimes.' Thus, Henry Hudson, in 1607, notices the change in the colour of the sea, but has fallen into error when he attributes it to the presence or absence of ice whether the sea was blue or green—mere accidental coincidences. John Davis, when, at even an earlier date, he made that famous voyage of his with the 'Sunshine' and the 'Moonshine,' notes that, in the strait which now bears his name, "the water was black and stinking, like unto a standing pool." More modern voyagers have equally noted the phenomenon, but without giving any explanation, and it is the object of this paper to endeavour

to fill up that blank in the physical geography of the sea. In the year 1860, I made a voyage to the seas in the vicinity of Spitzbergen and the dreary island of Jan Mayen, and subsequently a much more extended one through Davis' Straits to the head of Baffin's Bay, and along the shores of the Arctic regions lying on the western side of the former gulf, during which I had abundant opportunities of observing the nature of this discoloration. At that period I arrived at the conclusions which I am now about to state. In the course of the past summer I again made an expedition to Greenland, passing several weeks on the outward and homeward passages in portions of the seas mentioned, during which time I had an opportunity of confirming the observations I had made seven years previously, so that I consider that I am justified in bringing my researches, so far as they have gone, before the Botanical Society.

(1.) *Appearance and Geographical Distribution of the Discoloured portions of the Arctic Sea.*—The colour of the Greenland Sea varies from ultramarine blue to olive-green, and from the most pure transparency to striking opacity, and these changes are not transitory but permanent.* Scoresby, who sailed during his whaling voyages very extensively over the Arctic Sea, considered that in the "Greenland Sea" of the Dutch—the "Old Greenland" of the English—this discoloured water formed perhaps one-fourth part of the surface between the parallels of 74° and 80° north latitude. It is liable, he remarked, to alterations in its position from the action of the current, but still it is always renewed near certain localities year after year. Often it constitutes long bands or streams lying north and south, or N.E. and S.W., but of very variable dimensions. "Sometimes I have seen it extend two or three degrees of latitude in length, and from a few miles to ten or fifteen leagues in breadth. It occurs very commonly about the meridian of London in high latitudes. In the year 1817 the sea was found to be of a blue colour and transparent all the way from 12° east, in the parallel of 74° or 75° N.E., to the longitude of 0° 12′ east in the same parallel. It then became green and less transparent; the colour was nearly *grass green*, with a shade of black. Sometimes the transition between the green and blue waters is progressive, passing through the intermediate in the space of three or four leagues; at others it is so sudden that the line of separation is seen like the rip-

* Scoresby, 'Arctic Regions,' vol. i. p. 175.

pling of a current; and the two qualities of the water keep apparently as distinct as the waters of a large muddy river on first entering the sea."* In Davis' Straits and Baffin's Bay, wherever the whalers have gone, the same description may hold true—of course making allowances for the differences of geographical position, and the discoloured patches varying in size and locality. I have often observed the vessel in the space of a few hours, or even in shorter periods of time, sail through alternate patches of deep black, green, and cærulean blue; and at other times, especially in the upper reaches of Davis' Straits and Baffin's Bay, it has ploughed its way for fifty or even a hundred miles through an almost uninterrupted space of the former colour. The opacity of the water is in some places so great that "tongues" of ice and other objects cannot be seen a few feet beneath the surface.

(2.) *Cause of the Discoloration.*—These patches of discoloured water are frequented by vast swarms of the minute animals upon which the great "Right whale" of commerce (*Balæna mysticetus*, Linn.) alone subsists, the other species of *Cetacea* feeding on fishes proper, and other highly-organized tissues. This fact is well known to the whalers, and, accordingly, the "black water" is eagerly sought for by them, knowing that in it is found the food of their chase. and, therefore, more likely the animal itself. From this knowledge, and from observations made with the usual lucidity of that distinguished observer, Captain Scoresby attributed the nature of the discoloration to the presence of immense numbers of *medusæ* in the sea, and his explanation has been accepted by all marine-physical geographers; and for more than forty years his curious estimate of the numbers of individual *medusæ* contained in a square mile of the Greenland sea has become a standard feature in all popular works on zoology, and a stock illustration with popular lecturers. In 1860, and subsequently, whilst examining microscopically the waters of the Greenland sea, I found, in common with previous observers, that not only were immense swarms of animal life found in these discoloured patches, but that it was almost solely confined to these spaces. In addition, however, I observed that the discoloration was not due to this *medusoid* life, but to the presence of immense numbers of a much more minute object—a beautiful moniliform diatom, and it is this diatom which brings this paper within the ken of botanists. On several cold days, or from no appa-

* Scoresby, 'Arctic Regions,' vol. i. p. 176.

rent cause, the *medusæ*, great and small, would sink, but still the water retained its usual colour, and on examining it I invariably found it to be swarming with *Diatomaceæ*—the vast preponderance of which consisted of the diatom referred to.

It had the appearance of a minute beaded necklace about $\frac{1}{400}$ part of an inch in diameter, of which the articulations are about $1\frac{1}{2}$ or $1\frac{1}{4}$ times as long as broad. These articulations contain a brownish-green granular matter, giving the colour to the whole plant, and again through it to the sea in which it is found so abundantly. The whole diatom varies in length, from a mere point to $\frac{1}{10}$ of an inch, and appears to be capable of enlarging itself indefinitely longitudinally by giving off further bead-like articulations. Wherever, in those portions of the sea, I threw over the towing-net, the muslin in a few minutes was quite brown with the presence of this alga in its meshes. Again, this summer, I have had occasion to notice the same appearance in similar latitudes on the opposite shores of Davis' Straits where I had principally observed it in 1860. This observation holds true of every portion of discoloured water which I have examined in Davis' Straits, Baffin's Bay, and the Spitzbergen or Greenland Seas, viz. that wherever the green water occurred, the sea abounded in *Diatomaceæ*, the contrary holding true regarding the ordinary blue water. These swarms of diatoms do not appear to reach in quantity any very great depth, for in water brought up from 200 fathoms there were few or no diatoms in it. They seem also to be affected by physical circumstances, for, sometimes in places where a few hours previously the water on the surface was swarming with them, few or none were to be found, and in a few hours they again rose. But the diatom I found plays another part in the economy of the Arctic Seas. In June, 1860, whilst the iron-shod bows of the steamer I was on board of crashed their way through among the breaking-up floes of Baffin's Bay, among the Women's Islands, I observed that the ice thrown up on either side was streaked and coloured brown, and on examining this colouring-matter I found that it was almost entirely composed of the moniliform diatom I have described as forming the discolouring matter of the iceless parts of the icy sea. I subsequently made the same observation in Melville Bay, and in all other portions of Davis' Straits and Baffin's Bay where circumstances admitted of it. During the long winter the *Diatomaceæ* had accumulated under the ice in such abundance that when disturbed

by the pioneer prow of the early whalers they appeared like brown slimy bands in the sea, causing them to be mistaken more than once for the waving fronds of *Laminaria longicruris* (De la Pyl.) (which, and not *L. saccharina*, as usually stated, is the common tangle of the Arctic Sea). On examining the under surface of the upturned masses of ice, I found the surface honey-combed, and in the base of these cavities vast accumulations of *Diatomaceæ*, leading to the almost inevitable conclusion that a certain amount of heat must be generated by the vast accumulations of these minute organisms, which thus mine the giant floes, so fatal in their majesty, into cavernous sheets. These are so decayed in many instances as to be easily dashed on either side by "ice chisels" of the steamers which now form the greater bulk of the Arctic-going vessels, and they get from the seamen, who too frequently mistake cause for effect, the familiar name of "rotten ice." I find that, as far as the mere observation concerning the diatomaceous character of these slimy masses is concerned, I was forestalled by Dr. Sutherland (Appendix to 'Penny's Voyage,' cxcviii. and vol. i. pp. 91, 96). This gives me an opportunity of remarking that though one diatom, as I have remarked, predominates, yet vast multitudes are there of many different species, and even *protozoa* are included; for though Dr. Sutherland expressly states that this brown slimy mass was principally composed of the moniliform diatom spoken of, yet Professor Dickie (now of Aberdeen) found in it also *Grammonema Furgensii*, Ag., *Pleurosigma Thuringica*, Kg., *P. fasciola*, *Triceratium striolatum*, *Naviculæ*, *Surirellæ*, etc. Is it, therefore, carrying the doctrine of final causes too far to say that these diatoms play their part in rendering the frozen north accessible to the bold whalemen, as I shall presently show they do, in furnishing subsistence for the giant *quarry* which leads him thither?

I have spoken of the discoloured portions of the Arctic Sea as abounding in animal life, and that this life was nowhere so abundant as in these dark spaces which owe this hue to *Diatomaceæ*.

These animals are principally various species of *Beroidæ*, and other steganophthalmous *Medusæ*; *Entomostraca*, consisting chiefly of *Arpacticus Kronii*, *A. chelifer* and *Cetochilus arcticus*, *septentrionalis*; and pteropodous mollusca, the chief of which is the well-known *Clio borealis*, though I think it proper to remark that this species does not contribute to the whales' food nearly so much as we have been taught

to suppose. The discoloured sea is sometimes perfectly thick with the swarms of these animals, and then it is that the whaler's heart gets glad as visions of "size whales" and "oil money" rise up before him, for it is on these minute animals that the most gigantic of all known beings solely subsists. What, however, was my admiration (it was scarcely surprise) to find, on examining microscopically the alimentary canals of these animals, that the contents consisted entirely of the *Diatomaceæ* which give the sable hue to portions of the Northern Sea in which these animals are principally found! It thus appears, that in the strange cycle of nature, the "whales' food" is dependent on this diatom! I subsequently found (though the observation is not new) that the alimentary canals of most of the smaller *Mollusca*, *Echinodermata*, etc., were also full of these *Diatomaceæ*. I also made an observation which is confirmatory of what I have advanced regarding the probability of these minute organisms giving off *en masse* a certain degree of heat, though in the individuals inappreciable to the most delicate of our instruments. On the evening of the 4th of June, 1867, in latitude 67° 26′ N., the sea was so full of animal (and diatomaceous) life, that in a few minutes upwards of a pint measure of *Entomostraca*, *Medusæ*, and *Pteropoda* would fill the towing-net. The temperature of the sea was then by the most delicate instruments found to be 32·5° Fahr., and next morning (June 5th), though the air had exactly the same temperature, no ice at hand, and the ship maintained almost the same position as on the night previous, yet the surface temperature of the sea had sunk to 27·5° Fahr., and was clear of life, —so much so, that in the space of half an hour the towing-net did not capture a single *Entomostracon*, *Medusa*, or *Pteropod*. I also found that this swarm of life ebbed and flowed with the tide, and that the whalers used to remark that whales along shore were most frequently caught at the flow of the tide, coming in with the banks of whales' food. This mass of minute life also ascends to the surface more in the calm arctic nights when the sun gets near the horizon during the long, long summer. In 1860 I was personally acquainted with the death of thirty individuals of the "right whalebone whale" (*Balæna mysticetus*, L.), and of this number fully three-fourths were killed between ten o'clock P.M. and six o'clock A.M., having come on the "whaling grounds" at that period (from amongst the ice where they had been taking their *siesta*), to feed upon the animals which were

then swarming on the surface, and these again feeding on the *Diatomaceæ* found most abundantly at that time in the same situations. I would, however, have you to guard against the supposition, enunciated freely enough in some compilations, that the "whales' food" migrates, and that the curious wanderings of the whale north, and again west and south, is due to its "pursuing its living;" such is not the case. The whales' food is found all over the wandering ground of the *mysticete*, and in all probability the animal goes north in the summer in pursuance of an instinct implanted in it to keep in the vicinity of the floating ice-fields (now melted away in southern latitudes); and again it goes west for the same purpose, and finally goes south at the approach of winter—but where, no man knows. There are some other streaks of discoloured water in the Arctic Sea known to the whalers by various not very euphonious names, but these are merely local or accidental, and are also wholly due to *Diatomaceæ*, and with this notice may be passed over as of little importance. I cannot, however, close this paper without remarking how curiously the observations I have recorded afford illustrations of representative species in different and widely separated regions. In the Arctic Ocean the *Balæna mysticetus* is the great subject of chase, and in the Antarctic and Southern Seas the hardy whalemen pursue a closely allied species, *Balæna australis*. The northern whale feeds upon a *Clio borealis* and *Cetochilus septentrionalis*; the southern whale feeds upon their representative species, *Clio australis* and *Cetochilus australis*, which streak with crimson the Southern Ocean for many a league. The Northern Sea is dyed dark with a diatom on which the *Clios* and *Cetochili* live, and the warm waters of the Red Sea are stained crimson with another; and I doubt not but that, if the Southern Seas were examined as carefully as the Northern have been, it would be found that the Southern whales' food lives also on the diatoms staining the waters of that Austral Ocean.

I do not claim any very high credit for the facts narrated in the foregoing paper, either general or specific, for really it is to the exertions of the ever-to-be-admired sailor-*savant*, William Scoresby, that the first faint light which has led to the solution of the question is due, though the state of science in his day would not admit of his seeing more clearly into the dark waters of that frozen sea he knew and loved so well.

At the same time, I believe that I am justified in concluding that

we have now arrived at the following conclusions from perfectly sound data, viz.:—

(1.) That the discoloration of the Arctic Sea is due not to animal life, but to *Diatomaceæ*.

(2.) That these *Diatomaceæ* form the brown staining matter of the "rotten ice" of Northern navigators.

(3.) That these *Diatomaceæ* form the food of the *Pteropoda*, *Medusæ*, and *Entomostraca*, on which the *Balæna mysticetus* subsists.

I have brought home abundant specimens of the diatomaceous masses which I have so frequently referred to in this paper, and I am now engaged in distributing them to competent students of this Order, so that the exact species may be determined; but as these take a long time to be examined (more especially as diatoms do not seem so popular a study as they were a few years ago), I have thought it proper to bring the more important general results of my investigations before you at this time, and to allow the less interesting subject of the determination of species to lie over to another time. I have to apologize to you for introducing so much of another science, foreign to the objects of the Society, into this paper; but when the lower Orders of plants are concerned, we are so near to the boundaries of the animal world, that to cross now and then over the shadowy march is allowable, if not impossible to be avoided.

Finally, you will allow me to remark that, in all the annals of biology, I know nothing more strange than the curious tale I have unfolded: the diatom staining the broad frozen sea, again supporting myriads of living beings which crowd there to feed on it, and these again supporting the huge whale,—so completing the wonderful cycle of life. Thus it is no stretch of the imagination to say that the greatest animal in creation,* whose pursuit gives employment to many thousand tons of shipping and thousands of seamen, and the importance of which is commercially so great that its failure for one season was estimated for one Scottish port alone at a loss of £100,000 sterling,† depends for its existence on a being so minute that it takes

* Nilsson, in his 'Skandinaviske Fauna,' vol. i., estimates the full-grown *B. mysticetus*, at 100 tons or 220,000 lb., or equal to 88 elephants or 442 white bears.

† In 1867 the twelve screw-steamers of Dundee only took two whales, and the loss to each steamer was estimated at £5000, and to the town in all at the sum I have given.

thousands to be massed together before they are visible to the naked eye, and, though thousands of ships have for hundreds of years sailed the Arctic, unknown to the men who were most interested in its existence; illustrating in a remarkable degree how nature is in all her kingdoms dependent on all—and how great are little things!

ON THE PRESENT DOMESTIC USE OF LICHEN DYE-STUFFS IN THE SCOTTISH ISLANDS AND HIGHLANDS.

[Being portion of a paper "On the Present Use of Lichens as Dye-Stuffs," read before Section B. (Chemical Science) of the British Association at Dundee, in September last, by Dr. LAUDER LINDSAY, of Perth.]

Many years ago, Lichenologists ventured to assert, that if there lingered then in the more remote corners, or less accessible districts, of Scotland, any vestige of the domestic or home use of Lichens as dye-stuffs,—a practice which at one time largely prevailed,—such a rude procedure or custom would speedily disappear before the march of civilization; the penetration of the Highlands by railways—the establishment of regular steam communication between Edinburgh or Glasgow, and the western and northern islands and coasts: the cheapening and multiplication of coal-tar, or other dye-stuffs, and of the printed goods, woollen and cotton, of Glasgow and Manchester, Leeds and Bradford. The 'Synopsis of the Vegetable Products of Scotland' in the Museum of the Royal Botanic Garden of Kew, states that "*all* the *native* vegetable dyes are . . . falling into disuse from the cheapness and facility with which those of foreign origin can be procured." And this statement was not made without due, though local, inquiry; for my friend Mr. Ravenscroft, of the firm of Messrs. Lawson, of Edinburgh, by whom the said collection was arranged, originally for the Exhibition of 1851, collected his information and specimens alike in the district around Fort Augustus in 1850.

The object of my present communication is to show that all such predictions and assertions are at least premature. Evidence of a contrary kind has presented itself to me, somewhat unexpectedly I confess, during a tour in the summer of 1866, through the Hebrides, Orkney, and Shetland: to which I have been enabled to add confirmatory evidence collected previously or subsequently in Caithness, Inverness, and

Perth-shires, and other parts of the Scottish mainland. The evidence in question proves that the domestic use of lichen-dyes is prevalent over whole districts in Scotland, even in and around large seaports, which have steam communication with Glasgow and Edinburgh, sometimes two or three times a week, and which may be presumed, therefore, to be well supplied with the cheapest and most abundant products of British manufacture.

During a visit to the Lewis (Outer Hebrides) in May, 1866, I made special inquiry as to the use of Lichens as dye-stuffs among the peasantry. The result was the discovery that "Crottle" is universally known and used throughout the Long Island, even in and around Stornoway, a large and much frequented seaport, which is one of the chief centres of the herring fishery in Scotland, is in regular and frequent steam communication with Glasgow and Edinburgh, and, moreover, is largely peopled by an immigrant population from the mainland of Scotland. The Crottle in common use in the Long Island was pointed out to me in its place of growth, by Mr. Macrae, of Uig (Myavik), whose wife is experienced in its tinctorial applications. I was enabled to identify it as the ordinary saxicolous form of *Parmelia saxatilis;* dark grey, but not furfuraceous, usually sterile. Young Crottle is preferentially collected by the peasantry,—that which adheres closely to the stones or rocks on which it grows, and has no attached soil or impurity, a preference which appears to be grounded, at least partly, on the circumstance that this young condition of the plant saves cleaning and picking. The plant is rare about Stornoway, but would appear to be abundant in the parish of Lochs, where, in the Lewis, it is chiefly collected. It is applied in dyeing with various shades of brown or reddish-brown—including claret, heather, and chestnut tints—home-spun yarns made from the wool of the sheep fed on the island. These yarns are either woven or knitted into various fabrics, which include chiefly—

1. "Kelt," a home-made cloth (woven), used for trousers, shirts, vests, jackets, and kilts; a material which, I believe, would outwear many tweeds, but which is manufactured only for home use, and is so scarce in the local markets, if it occur at all, that I could procure none to purchase. Kelt for coats or jackets is, however, usually dyed blue with indigo (imported); but trouserings and vest-pieces, on the other hand, are generally heather-coloured by Crottle.

2. Hearthrugs.

3. Polkas and scarfs for women (knitted) *e.g.* those specially made for the women of Ness.

4. Stockings and socks of all kinds and sizes (knitted).

Extreme variety of practice exists as to the precise process of dyeing, especially in reference to the use or non-use of mordants (such as Sumac, alum, and copperas); the employment of Crottle alone, or in combination with other native dyes (such as Heather, Alder-bark, Water-lily, or Soot); the selection of white or grey yarns; and the determination of the pattern (striped or plain). But the essentials of the process of preparation and application appear to be that—

1. The Lichen is crushed into a coarse powder between stones.

2. It is steeped or not in water, to cleanse apparently from impurities.

3. Alternate layers of yarn and powdered Crottle are laid in an iron pot; and,—

4. The whole is boiled in water, generally without addition of any kind.

It is noteworthy here, that no form of ammoniacal maceration is resorted to; the former use of putrid urine, and the Graith pig appears to be unknown. The result of the discontinuance of this custom is, however, a less variety of colours, and an inferior beauty of shade, especially as regards its character of Orchill, *i.e.* the possession of a red or purple hue.

The yarn is thus dyed, and the articles of clothing above enumerated are woven or knitted, for the most part, by the female part of the population, and of all grades, from the minister's wife to the poorest cotter, chiefly during the long dreary season of winter; and I may note here, that in respect of their industry in worsted work, the Long Islanders resemble the inhabitants of the more northern islands of Iceland, Faroe, and Shetland. Harris is the great centre of the native woollen manufactures I refer to. The goods in question are made, in the first place, for home use, and the finest qualities are invariably reserved for this end, and so are not to be met with in the market. But the surplus is brought or sent for sale, or rather for exchange, to the annual fair at Stornoway, in July, from all parts of the Long Island, and even from remote St. Kilda. The dealings of the peasantry are mainly with a few old-established native merchants, with whom they

barter their handiwork for tea, sugar, tobacco, hardware, and crockery. Money payments are scarcely known. I visited Stornoway towards the close of the season, in May, when the produce of the preceding annual fair may be supposed to have been dispersed and disposed of. Nevertheless I had no difficulty in meeting with abundant specimens of stockings (specimens of which were shown in the Exhibition of Art and Industry in connection with the British Association at Dundee in September last) in the shops of a few of the older-established merchants. The cost of the longer stockings was about 1*s.* 2*d.* a pair, and of the socks 5*d.* to 7*d.* per pair; they are coarse and inferior in this respect to the produce of Shetland; but it must be remembered that they are the remnants of the season, and as such the most unfavourable specimens I could exhibit of the handiwork of the Long Island peasantry. Whether it is that a sensitive nationality or provinciality inspires me with the feeling, I am not prepared to confess; but the coarse Lewis stockings referred to have, in my eyes and nostrils, a peculiar interest, in so far as they exhale a delightful fragrance of the "Peat-reeke" of old Scotland, and exhibit the warm colours of its native heather!

Harris and Lewis stockings are also largely sold in Glasgow.

While indigenous Lichen-dyes are so widely used in the Long Island, it is of interest to record that Orchill is unknown in Stornoway, as are also the modern aniline and allied dyes. But Cudbear is kept by every grocer in that seaport, apparently of one shade and quality supplied from Glasgow, but manufactured necessarily in some of the English towns (*e.g.* London); there being now no manufactory of either Cudbear or Orchill, so far as I am aware, in Scotland. Cudbear is used for dyeing blankets and shawls a crimson-red, and for mixing with Crottle, or other native dye-stuffs.

In some parts of the Long Island, *Ramalina scopulorum*, under a Gaelic name, which signifies "Goat's Beard," is also used to dye yarn yellow without a mordant. Its use, however, is greatly restricted and very local as compared with Crottle. My informant, Mr. Macrae, did not know of its use in the Uig district, which is one pre-eminently characterized by the primitiveness of the customs of its inhabitants. I subsequently found that the same species, under the name "Old Man," was at one time used in Shetland to yield a yellow dye.

I found Sutherland and Caithness a duplicate, on a minor scale, of

the Long Island, in respect of the customs of the peasantry as regards the domestic manufacture of clothing, and the application of Crottle, and other native dye-stuffs. In the neighbourhood of Strathy, for instance, the cloth called "home-scourings"—the equivalent of the Lewis "kelt"—whereof the shepherds' coats are fashioned, is commonly woven, and the stockings worn by all classes of the community are constantly being knitted; the yarn used being usually dyed with Crottle, Heather, or other native dyes, similar to, or identical with those of Lewis and Harris. Some of the Thurso merchants barter with the peasantry for their surplus woollen produce, just as in Stornoway; and, as around that seaport also, Crottle is rare, and is collected on the hills and moors of the interior of Sutherland, where it would appear to abound.

The only other illustration I consider it of interest to bring under your notice is that of the hosiery of Fair Isle, one of the Shetland group, which is unique in Scotland on account of the peculiarity alike of the colours, which are extremely bright and gaudy, and of the patterns, which differ remarkably from those that are the common characteristics of hosiery, not only in Shetland, but in all other parts of Britain. These Fair Isle goods are apparently in great demand in the southern markets, such as Edinburgh and Glasgow, and even London. The long stockings, the nightcaps and caps for men, of which they chiefly consist, are largely sold in Lerwick and Kirkwall; and I have seen a similar exhibition of Fair Isle produce in the Shetland warehouses of Edinburgh. Local tradition, both in Orkney and Shetland, points to the Spanish Armada as the source of the teaching of the weaving of the peculiar patterns, if not of the application also of the parti-coloured dyes; and my friend the Rev. Biot Edmonstone, of Blair-Drummond, who is a Shetlander, and has travelled moreover in Spain, tells me that the gaudy variegations of yellow, red, and blue, in Fair Isle stockings are exactly the characteristic of the long stockings still worn by the Spanish peasantry. I see no good ground for doubting that these unique patterns originated in the wreck of the Spanish Armada in 1588; and if this origin is accepted, the peculiar character of the Fair Isle hosiery is a most interesting example of an exotic manufacture holding ground in a most limited area, and apparently most unlikely field, for an unusually long period.

I have collected a considerable mass of materials relating to the pre-

sent use of Lichens as domestic dye-stuffs in other parts of the Scottish Highlands and Islands, in Wales, in India and Ceylon, and in South America; but I must content myself at present with this mere reference thereto.

DIAGNOSES OF TWO NEW CHINESE CYPERACEÆ.

By H. F. Hance, Ph.D.

Carex Sampsoni, n. sp.; radicibus fibrosis, culmis subpedalibus basi foliatis compressis sulcatis scaberulis, foliis atro-viridibus linearibus circ. 12-nerviis 2 lineas latis margine denticulato-scabris culmis dimidio brevioribus inferioribus ad vaginas scariosas reductis infimis denique in fibras solutis, spicis plerumque 3- circ. 7–10-linealibus terminali mascula cylindrica pallida reliquis fœmineis crassioribus incluse v. leviter exserte pedunculatis, bracteis foliaceis culmo brevioribus, perigyniis lanceolatis longe rostratis ore alte bicuspidato crebre striato-nervosis pubescentibus fuscis, squama oblonga obtusa v. emarginata alba nervo viridi percursa in acumen hirsutum sæpius excurrente perigynio angustiore basin rostri attingente, achænio castaneo stipitato obovoideo trigono angulis medio exsculptis basi persistente styli conspicue apiculato, stigmatibus 3 tomentosis.

Ad bases rupium, insula Ku-lang-sú, d. 10 Maii 1866, coll. cl. T. Sampson. (Exsicc. n. 13059.)

Allied to *C. Harlandi*, Boott, *C. tenebrosa*, Boott, and especially *C. manca*, Boott, but differs from all in its short leaves; from the first-named also by its tomentose perigynia and narrow leaves; it resembles *C. tenebrosa*, chiefly in colour, but is in other respects different; from *C. manca*, which has very similar squamæ, achænia, and perigynia, it may be at once distinguished by its short leaves and dark tint.

Fimbristylis (Eufimbristylis) gracilenta, n. sp.; radice tenui fibrosa, culmis basi foliatis setaceis sulcatis inferne glaberrimis superne tomentellis foliis angustissimis sæpe involutis tomentellis apice acutis basin umbellæ attingentibus, vaginis late albo-membranaceo-marginatis, umbellæ radiis 6–8 dense et breviter patulo-pilosis nunc bifidis inæqualibus, involucri phyllis 5–6 valde inæqualibus, spicis lanceolato-linearibus acutis 1–3 in radiis alteraque centrali sessili, squamis undique imbricatis pallide brunneis lanceolatis nervo carinali excurrente,

stylo bifido apice piloso basi subcordato-bulboso, achænio pallide brunneo stipitato lenticulari-obovoideo sub lente tenuissime puncticulato.

In arenosis graminosis insulæ Danorum, Whampoæ, ipse legi ineunte Augusto, 1866. (Exsicc. n. 13227.)

In habit this approaches *F. Cioniana*, Savi, and especially *F. tenera*, R. and S.; but, on account of its achene and bifid style, its true affinity is rather with *F. squarrosa*, Vahl, *F. æstivalis*, Vahl, and cognate species.

LIST OF SOME OF THE RARER FUNGI FOUND NEAR KENILWORTH.

After reading Mr. W. G. Smith's interesting communications in the 'Journal of Botany' for this and last month, I am led to offer a list of some of the less common species of fungi met with by myself in the immediate neighbourhood of Kenilworth, during the last two seasons, especially as the destruction of timber is going on to such an extent down here, that I augur a great diminution of the fungological harvest, which was a very poor one last year as compared with the unusually prolific one of 1866.

Agaricus (Clitocybe) fumosus; A. (Entoloma) repandus. Both on banks under trees, in the Birmingham Road.

Agaricus (Hebeloma) scaber. Dalehouse Lane.

Cortinarius (Dermocybe) diabolicus. Birmingham Road.

Cortinarius (Telamonia) periscelis. Birmingham Road, in boggy ground, caused by a spring running through masses of decayed leaves.

Hygrophorus olivaceo-albus. Bank, under trees, Birmingham Road.

Lactarius chrysorrhœus. Same situation as the last.

Boletus sanguineus. Grassy border of the Red Lane, where it first bends to the left; and in Crackley Wood, close to the pathway, a few hundred yards from the upper gate.

Polyporus intybaceus. Old Oaks, Parkfield. Brought to me by a friend.

Polyporus giganteus. Bank, among trees, in Dalehouse Lane. I have also seen it far more beautifully developed, several years ago, in Crackley Wood.

Polyporus salignus. At foot of an old Apple-tree in my own garden, where, after being cut away, it reappears in a year or two.

Polyporus fraxineus. Growing up the foot of a post, in the lane beyond Dunspits Farm.

Peziza (Sarcoscypha) radiculata. Barrow-well Lane, on the bare earth, in December.

Amongst the numerous species which the neighbourhood affords, I may specify, as found at other times :—

Agaricus (Clitocybe) opacus.

A. (Clitocybe) inversus.

A. (Pleurotus) euosmus.

A. (Pleurotus) subpalmatus.

A. (Omphalia) rufulus.

A. (Pholiota) adiposus.

A. (Psalliota) squamosus.

A. (Psathyra) bifrons.

A. (Coprinus) Hendersonii. This I have only seen once, on horse-dung, in Crackley Wood.

Hygrophorus calyptræformis.

Lactarius glyciosmus.

Russula rosacea.

Craterellus cornucopioides. Found by a friend in Crackley Wood.

On seeing Mr. W. G. Smith's figure of *Morchella crassipes* in the January number, my delight was great at the clearing up of what has long been a great puzzle to me, viz. the discrepancy between most of the figures of *Morchella esculenta* that have come under my notice (especially the one in Mr. Berkeley's 'Outlines of British Fungology') and the specimens of that species, as I *supposed*, gathered by me at different times in the damp, mossy shrubbery of Wick House, between Bristol and Brislington. I felt certain that my plant must be Mr. Smith's *M. crassipes*. The figure is *precisely* it, only I never found any specimen quite so large as the one which he has drawn.

ANNA RUSSELL.

Clarendon Villa, Kenilworth, February 6th, 1868.

HENNA IN CHINA.

Lawsonia alba is a common shrub of cultivation in Kwangtung,

and its flowers are extensively used in bouquets, and by women to adorn their hair; but numerous inquiries that I have made among a Punti population have failed to elicit any logical reason for its name, *chí-káp-fá* (finger-nail flower), and it is interesting to find that, though not generally known to the Puntis, the custom of dyeing the finger-nails by an application of the pounded leaves of this shrub, exactly as has been done for thousands of years, and is done to this day in the West of Asia, is practised by the young girls among the Hakkas of Kwangtung.—"Cantoniensis" in 'Notes and Queries on China and Japan,' vol. i. p. 40.

THE "PAPER BARK" TREES OF NEW SOUTH WALES.

The "Paper Bark" trees of New South Wales belong to the Natural Order of the *Myrtaceæ*, or Myrtle family, and have a thick outer covering or bark, composed of many layers of a minutely divisible paper-like substance, varying from a dark to a very light brown colour, and capable of being separated into very thin layers. The trees producing this peculiar kind of bark indigenous to New South Wales, are:—

Melaleuca linarifolia.
M. pauciflora.
M. Leucadendron.
M. styphelioides.
M. viridiflora.
M. genistifolia.
M. squarrosa, also found in Tasmania.
Metrosideros glomulifera.
Callistemon salignus.
C. lanceolatus.
C. viridiflorus; found also in New Caledonia.

George Bennett, M.D.

ON A NEW CHINESE ACANTHACEA.

By H. F. Hance, Ph.D., etc.

Ruellia venusta, n. sp.; erecta, caule 4-angulo scabrido, foliis oblongo-lanceolatis integerrimis obtuse acuminatis basi longe attenuatis sed vix petiolatis (lamina nempe ad insertionem producta) 3–5 poll. longis $1\frac{1}{4}$ poll. latis supra passim subtus præcipue in venis pilis arti-

culatis strigillosis, floribus axillaribus solitariis 2-nisve, bracteis foliis similibus sed multo minoribus calycem æquantibus vel duplo superantibus nunc deficientibus, calycis 4–5-linealis lobis lineari-subulatis æqualibus, corolla infundibulari pallide cærulea venulosa e tubo recto gracili $1\frac{1}{2}$-pollicari intus extusque puberulo in limbum campanulatum pollicarem subregularem fere glaberrimum æqualiter ampliata lobis truncatis vel emarginatis symptyxi contortis, staminibus 4 apice tubi insertis ad basin loborum attingentibus æqualibus vel subæqualibus, antheris muticis 2-locularibus loculis parallelis apice basique sinu acuto discretis, stylo stamina vix superante stigmate æqualiter 2-lobo, capsula angusta compressa basi apiceque attenuata valvis medio secus septum extus sulcatis ab ima basi usque ad medium et ultra circ. 16-sperma, dissepimento completo, seminibus oblongis compressissimis.

In umbrosis silvæ supra monasterium Fi-loi-tsz, ad angiportum Tsing-yune, fl. North River, provinciæ Cantoniensis, d. 18 Sept. 1866, collegerunt Sampson et Hance (Exsicc. n. 13767).

This very lovely and apparently quite distinct plant would properly fall into *Ruellia* of Nees, as contradistinguished from *Dipteracanthus*, at least so far as the written differential character goes, the capsule bearing seeds to the very base. Dr. Anderson, however, in his ‘Enumeration of African *Acanthaceæ*’ (Journ. Linn. Soc. vii. 14), expressly limits his subtribe *Euruellieæ* by the “capsula basi sterilis, supra medium seminifera.” But, as I do not know where Dr. Anderson would place the Chinese plant; and, as it seems to me naturally closely allied to *R. strepens*, Linn., and *R. ciliosa*, Pursh, I have retained it in the genus drawn up, to show the grounds of my belief, a rather full diagnosis, in which the principal structural points employed for generic distinction in the Order are noted.

P.S. Since the above was written, I have received the 39th and 40th parts of vol. ix. of the ‘Linnean Journal,’ containing Dr. Anderson's Conspectus of the Indian *Acanthaceæ*. I think my diagnosis will show that, after all, no genus characterized by that eminent botanist will admit the Chinese plant, except *Ruellia*. As Nees, I must presume, after examination of some species at least, assigned to his *Ruellia* a capsule bearing seeds from the base, while Anderson asserts his *Hemigraphides*, to which he refers all Nees' *Ruelliæ*, to have a sterile-based fruit; and as the former structure certainly obtains in the Chinese plant, I suppose Dr. Anderson may have rather over-estimated its

value. The characters assigned (l. c. p. 443) to his subtribes *Euruellieæ* and *Strobilantheæ* are not differential, containing nothing to aid in distinguishing one from the other.

BOTANICAL NEWS.

The seventh part of Seemann's 'Flora Vitiensis' has just been completed, and includes the *Urticeæ, Ceratophylleæ, Piperaceæ, Chloranthaceæ, Casuarineæ, Coniferæ,* and *Cycadeæ.*

Agassiz' 'Journey in Brazil' (London: Trübner and Co.) contains many scattered botanical notes and some good woodcuts, illustrative of South American vegetation. The chief aim of Agassiz' great expedition is stated in this work to have been to obtain "the means of showing that the transmutation theory is wholly without foundation in facts."

Dr. N. J. Anderson, of Stockholm, sends us his interesting 'Aperçu de la Végétation et des Plantes Cultivées de la Suède.'

The second and concluding volume of Robert Brown's 'Miscellaneous Botanical Works' (containing Systematic Memoirs and Contributions to Systematic works), edited by Mr. J. J. Bennett, F.R.S., and published by the Ray Society, has just been issued.

Dr. Hanstein, of Bonn, has published a 'Synopsis of the Natural Orders for the use of Botanical Lecturers,' to which we would wish to draw attention as containing some novel combinations.

Dr. Schenk, of Würzburg, has been appointed Director of the Botanic Garden of Leipzig, vacant by the death of Dr. Mettenius.

Mr. Ed. Otto, Curator of the Botanic Garden of Hamburg, has lately bought a large nursery at Altona, and no longer holds the official position. He will continue to publish the Hamburg 'Gartenzeitung,' so ably edited by him for many years.

Botanical Society of Edinburgh.—Thursday, 12th December. Charles Jenner, Esq, President, in the chair.—The following communications were read:—I. On the Nature of the Discoloration of the Arctic Seas. By Robert Brown, Esq., F.R.G.S. II. on the Flora of Rannoch, Perthshire. By Dr. Buchanan White. The author included, under the title of Rannoch, that part of Perthshire which drains into Loch Rannoch—a lake about eleven miles in length, lying east and west, and closely approached on its longer sides by high mountains, but more open at either end—at the east where the Tummel flows out to discharge itself into the Tay, and at the west, where the tributary streams from Lochs Ganer, Lydoch, etc., wind through the desolate moor of Rannoch to swell the dark waters of the lake. The mountains, unlike those of the Breadalbane range, are well clothed, to some height, with heather and great beds of the fragrant *Myrica*, and, on

the lower slopes, openly wooded with birch-trees, still very numerous, but once covering the whole district. In one part of the south shore of the loch, a thick primeval pine (*Pinus sylvestris*) forest extends for about three miles, and, from its sombre appearance, is aptly named the "Black Wood." The timber of this forest is celebrated for its durability, and, only a few years ago, was valued at about £22,000. In its recesses occur many insects not found in any other part of Britain, and some even, as yet, undetected in any other place whatever. He concluded by giving a list of the plants he had collected in the district, and noted their altitudes, which were generally greater than anywhere else in Britain. III. Notice of a new *Carduus* gathered during a Botanical Visit to Ross-shire. By Mr. Charles Howie and Mr. Charles Jenner. Mr. Jenner laid on the table twelve sheets of specimens of a *Carduus*, new to Britain certainly, and probably new to Europe, if not new to science. The descriptive characters of the plant, which it is proposed to call *Carduus Carolorum*, will show botanists its distinctive peculiarities. It does not vary much from a plant described by Linnæus in his 'Species Plantarum,' edition 1753, under the name of *Carduus helenioides*, found in Siberia; but it is distinguished from it by some marked specific differences. It was gathered on the borders of Ross-shire, within a very circumscribed area, growing on a high bank above a rocky streamlet. Grim old indigenous trees of the *Pinus sylvestris* were thinly scattered up and down, and mountains of considerable elevation shadowed the place. This *Carduus* may perhaps be a hybrid between *C. palustris* and *C. heterophyllus*, but the point of interest is that it appears to be in every respect a true species, maintaining its place in nature by the power it has of reproducing itself, and of conserving its own special characteristics. The following are the characters:—*Root* perennial, fibrous, deeply rooting in the soil, cæspitose, producing several stems. *Stems* from 2 to 4 feet high, furrowed, slightly cottony, leafy from top to bottom, terminating in a corymb of from five to nine capitula. *Leaves*—Root-leaves lanceolate, gradually tapering at the base into a long petiole, sinuate-dentate, fringed with short unequal bristles, cottony beneath (but not so snowy white as *C. heterophyllus*), the upper surface pilose. Stem-leaves from twenty to thirty (cottony beneath also, and pilose above), lower narrowing into long winged petioles, lobed as well as deeply toothed, upper leaves more nearly sessile, semi-amplexicaul, with decurrent auricled prolongations; near the summit smaller, sharply toothed, acute at the point; floral leaves awl-shaped. *Involucres* obovate or globular. *Phyllaries* lanceolate, adpressed, acuminate, dentate towards the apex. *Pappus* deciduous, short, rigid, feathery, forming a ring at the base. *Achenes* ovate, compressed with a circular depression, into which the pappus is inserted. *Flowers* purple. A very handsome plant. IV. On the Botany of Frodsham Marshes, Cheshire. By Mr. J. F. Robinson, communicated by Mr. Sadler. Frodsham Marsh is a large tract of low-lying land, bounded on the north-east by the river Weaver, and on the north-west by the river Mersey; it is mostly well drained by gutters, which empty themselves into large ditches, the water eventually being conveyed to the river. As might be expected, the plants are principally aquatic species. The most conspicuous are *Butomus umbellatus*

and *Epilobium hirsutum*. The Frogbit (*Hydrocharis Morsus-ranæ*) covers the surface of many of the ditches; it is difficult to secure good specimens for the herbarium, owing to the under-surface of the leaves being the home of a kind of a gelatinous animalcule, which adheres to the drying paper. All the four species of Duckweed are to be met with. *Lemna gibba* must be looked for only in muddy water, where there is plenty of decaying vegetable matter—it is never seen, so far as my limited experience is concerned, in clean and apparently pure streams; *Ranunculus Baudotii*, *R. peltatus*, and *R. trichophyllus*, show their star-like blossoms in the early spring months in plenty. *R. circinatus* is abundant in deep water, but does not flower until the end of June. *Scutellaria galericulata*, *Samolus Valerandi*, *Œnanthe crocata*, and *Œ. Lachenalii*, are not uncommon; some states of the latter approach very closely to *Œ. pimpinelloides*, which I have not observed about Frodsham. The meadows are frequently gay with *Orchis latifolia*, *O. maculata*, *Genista tinctoria*, *Primula veris*, and *Ononis spinosa*. Hedges, such as they are, are principally composed of *Prunus spinosa* and *P. institia*. By the riverside, on what is termed the Score, *Cochlearia Anglica*, *C. officinalis*, *Lepigonum neglectum*, *L. salinum*, *Armeria maritima*, and *Glaux maritima*, occur in profusion, intermingled with *Plantago Coronopus* and *P. maritima*. The prevailing grass is *Festuca ovina*. *Rumex Hydrolapathum*, *Œnanthe fistulosa*, *Typha latifolia*, *Scirpus maritimus*, *Utricularia vulgaris*, and *Hottonia palustris*, are not rare. *Myriophyllum alterniflorum*, *M. spicatum*, *Helosciadium inundatum*, *Veronica Anagallis*, and *Scirpus lacustris*, on the contrary, are to be classed amongst the rare plants of our marsh ditches. In the marsh about Helsby, *Epilobium brachycarpum*, *Ceratophyllum demersum*, *Thalictrum flavum* the variety *Morisonii*, and *Barbarea præcox*, occur sparingly; those about Woodhouses contain *Œnanthe Phellandrium*, *Valeriana officinalis*, *Carex Pseudo-Cyperus*, and *Petasites vulgaris*; the latter is not at all common about Frodsham. *Anacharis Alsinastrum* will soon be a sad pest. Rushes muster in great force, yet they are only such as are generally found in boggy situations—namely, *Juncus effusus*, *J. conglomeratus*, *J. acutiflorus*, *J. lamprocarpus*, and *J. supinus*; on the other hand, sedges are neither numerous nor plentiful. *Carex disticha*, *C. riparia*, *C. panicea*, *C. pallescens*, *C. glauca*, and *C. vulpina*, are the only species I have as yet seen. *Setaria viridis* has been found, but I have no doubt it has been introduced with agricultural seeds. V. Botanical Rambles up the Weaver Valley. By Mr. James F. Robinson. The author gave an account of a botanical excursion which he had made up the valley of the Weaver in Cheshire, and noted the principal plants collected. VI. Observations on New Zealand Plants. By Dr. Lauder Lindsay. This was a continuation of a paper read at last meeting, and refers to plants belonging to the Natural Orders *Liliaceæ*, *Urticaceæ*, *Ericaceæ*, *Loranthaceæ*, *Ranunculaceæ*, *Cruciferæ*, *Geraniaceæ*, *Halorageæ*, *Portulaceæ*, *Ficoideæ*, *Polygoneæ*.

W. Mitten del. Fitch lith.

Vincent Brooks Imp.

NEW OR RARE BRITISH MOSSES.

By William Mitten, Esq., A.L.S.

(Plate LXXVII.)

Trichostomum flavo-virens, Bruch and Müller in (Regensb.) Bot. Zeit. 1829, p. 304. t. 7. Stems short, simple or dichotomous. Leaves patent from a more erect base, the lower ones smaller, shorter, and more erect, the upper longer, more spreading, and forming a rosette or coma, from which the stems are continued by innovations, in which the same arrangement of the leaves is reproduced, and the foliage is thus repeatedly interrupted; all the leaves are oblong-ligulate, obtuse, acute or mucronate, the apex flat or sometimes a little hooded, the margins entire and mostly incurved, so that the leaf is channelled; the nerve prominent on the bark is nearly of the same colour as the leaf, and is usually excurrent into a very short mucro; the cells of the upper portion of the leaf are rounded or subquadrate, all obscure, green or yellowish-green, when revived after long desiccation they are greyish or glaucous-green; at the base of the leaf the obscure cells are suddenly changed into elongate rectangulate white pellucid cells, which are continued nearly as far again up the margins of the leaf as they are in its middle, where they occupy a space in length about equal to the width of the leaf at that part. The perichætial leaves, except in being a little narrower, scarcely differ from those of the coma. The seta is red, a little flexuose. The capsule is oblong-cylindric or ovate-oblong, pale yellowish-brown, its mouth red. The operculum is acuminate, and about half as long as the capsule. The peristome, which is as long as the operculum, is composed of thirty-two erect, filiform, minutely dotted red teeth united at the base in pairs, and arising from a very short membrane. The calyptra is pale and glossy.—The male plant is more slender, with the antheridia enclosed by many small leaves into a terminal bud.—Hab. Shoreham Beach, Sussex, always sterile. Originally gathered in Sardinia by Müller, it is now known to grow along the northern and southern coasts of the Mediterranean, and fertile specimens were gathered on the coast of Portugal by Dr. Welwitsch.

In habit and size this species agrees nearly with *T. brachydontium*, Bruch and Müller (Regensb.), Bot. Zeit. 1829, p. 393. t. 3 (*Didy-*

modon brachydontius, Wils. in Eng. Bot. Suppl. t. 2735), but which was figured and described in the 'Bryologia Europæa' as *T. mutabile* (*Trichostomum*, t. 5). From this species, however, it differs in its more tender, more obscure, and softer leaves, with an evident white base, in which the hyaline elongate cells ascend along the margins of the leaf higher than they do in the middle by the nerve. Although perfectly distinct in inflorescence and in the straight peristome, it is *Tortula cæspitosa*, Schwægr. t. 31, that *Trichostomum flavo-virens* more nearly resembles than any other Moss, agreeing as it does in size, appearance, in the colour of its foliage, seta, and capsule; even in the areolation of the leaves it is almost exactly similar; and, it may be observed, that if the peristome of *T. flavo-virens* had been ever so little twisted, it must have been placed in *Tortula*, from the absence of any difference of structure.

There are some other British Mosses known hitherto in a barren state only, but which are evidently species very nearly allied to the more generally distributed *Trichostomum mutabile;* one of them has long been known, but it does not appear to be anywhere noticed. It may be thus characterized :—

Trichostomum diffractum. Stems growing in compact tufts more or less elongated, and repeatedly dichotomously divided. Foliage densely inserted, green or yellowish-green, becoming when old brown and persistent, not interruptedly comose, when dry crispate. Leaves recurved from a short, erect base, patent, all except the very youngest uniformly broken off halfway up, when complete they are linear-lanceolate, acute, slightly channelled, entire; the nerve thick, prominent on the back, in a dry state paler and shining, at the apex of the leaf it is excurrent into a short mucro; all the upper portion of the leaf is occupied by rounded, obscure cells, gradually towards the base becoming more elongate and translucent, and at the base the hyaline, oblong, rectangulate cells ascend higher along the margins than they do in the middle.—Hab. St. Vincent's Rocks, Clifton (Dr. Thwaites); Carnelly, and St. Michael's Chapel, Torquay (the late Mr. Borrer); on walls at Plymouth (Mr. Holmes).

From *T. mutabile* this differs in its more dense foliage not interrupted or comose, composed of leaves which are so generally broken off, as it would appear from their flexure, when passing from a wet to a dry state, that it is only on carefully-selected specimens that a single

entire leaf can be discovered. The areolation is similar to that of *T. mutabile*, except that the hyaline cells ascend at the margins, but occupy a much less space than they do in *T. flavo-virens*.

In the 'Bryologia Europæa,' as well as in the Synops. Musc. Europ. there is mentioned under *T. mutabile* a "var. *β. densum*," which is described as a smaller Moss, with "lanceolate leaves." This is also described in the same manner in the 'Bryologia Britannica.' No locality or other remark is made upon it in any of these works, and it must be different from the following:—

T. littorale. Stems growing in compact patches or tufted, more or less elongated, simple or divided by the growth of innovations. Foliage more or less distinctly interrupted and comose, the younger green or yellowish-green, the older becoming brown and persistent. Leaves erecto-patent, slightly recurved towards their points, all oblong-ligulate, obtuse, channelled, towards the apex subcomplicate; the nerve excurrent into a short mucro; at the base of the leaf the cells are pellucid, oblong and rectangulate; these occupy a space less in length than the width of the leaf, and do not ascend at the sides; above these the cells become gradually shorter, and all those occupying the upper portion are rounded and obscure.—Hab. Ireland (Drummond); Whitsand Bay, Cornwall (Mr. Brent, communicated by Mr. Holmes); below the cliffs, east of Hastings, in sandy ground.

Quite as tall as *T. mutabile*, but a much more slender-looking Moss, from its leaves being only about one-third as long as they are in that species. The leaves, from their shortness, subcomplicate, obtuse, not hooded points, and more erect position, have a different appearance from those of any of the other allied species, and cannot be said to have an outline that could be described as lanceolate.

Explanation of Plate LXXVII.

1. Fertile plant, natural size, completed from Müller's Sardinian specimens; 2. Leaf; 3. Capsule entire; 4. Portion of peristome, of *Trichostomum flavo-virens*. 5. Stem of natural size; 6. Leaf, magnified, of *T. defractum*. 7. Stems of natural size; 8 and 9. Leaves, magnified, of *T. littorale*.

Hurstpierpoint, February, 1868.

CONTRIBUTIONS TO BRITISH LICHENOLOGY.

By Isaac Carroll, Esq.

(*Continued from Vol. V. p.* 260.)

This list may serve to show how far the Killarney district appears to be from exhaustion. Of rare Lichens previously found, I may observe that *Lecidea pulverea*, Borr. (of which *Phialopsis livida*, Mudd, appears to be merely an undeveloped state), *Melaspilea amota*, Nyl., *Gomphillus calicioides, β. microcephalus*, Tayl., and *Verrucaria* glabratula*, Nyl., are frequent; *Acthonia anastomosans*, Ach., and *Thelotrema subtile*, Tuck., are less so. Several species, as *Arthonia ilicinella*, Nyl., and *Verrucaria desistens*, Nyl., I did not succeed in refinding, but this may be attributed to the shortness of my stay, and the minuteness of many of the rarer Lichens.

Collema flaccidum, *Ach., var.* microlobum, *Nyl.* With apothecia at Muckruss, Killarney (J. R. Hardy).

Calicium diploellum, *Nyl.*, n. s. On Holly, Cromaglown, Killarney, September, 1867 (I. Carroll). Plant exceedingly minute, and unlike any other British species. Spores pale brown, 1-septate, like those of Calicium pusillum, but smaller.

Lecidea carneola, *Ach.* On old Oak, Dinish, Killarney (I. Carroll). Asci 12-16-spored.

L. atropurpurea, Schær. Dinish and Cromaglown (I. Carroll). Erroneously referred to L. intermixta, *Nyl.*, in my last paper.

L. ascaridiella, *Nyl.*, *n. s.* On red sandstone at the base of Mangerton (Carroll).

L. pulvinata, *Tayl.* Mangerton (Dr. Taylor's habitat), but very rare (Carroll).

L. prasinoides, *Nyl.* in Flora, 1865, p. 146. On shaded rocks, Dinish Island, Killarney (Hardy and Carroll). Spores as in L. bacillifera, but shorter and 3-septate. A plant from the Armagh limestone, collected by Jones, and named L. bacillifera formerly by Nylander, appears to belong to L. prasinoides.

L. ochrophora, *Nyl. in Flora*, 1865, 355. On trees, Dinish, Killarney (Carroll). "Thecæ polysporæ, sporæ sphæricæ.—Species eximie distincta," *Nyl.* Paraphyses (in our Irish specimens) non discretæ.

L. Parmeliarum, *Summf.* = Abrothallus parasiticus (*Sm.*), *Nyl.* On thallus of Parmelia exasperata at the base of Mangerton (Carroll).

Opegrapha herpetica, *Ach. f.* Torc Mountain (Carroll).

O. viridis, *Pers.* = O. involuta, *Krb.* Torc Mountain, Dinish and Cromaglown (Carroll).

O. diplasiospora, *Nyl. N. Gran. ed.* 2. *p.* 92. On Holly, Torc Mountain and Cromaglown, rare, Sept. 1867 (Carroll). This fine South American Lichen is allied to O. lentiginosa, but has spores "duplo majores," etc.

Arthonia spectabilis (*Flot.*), *Nyl., f.* =

A. dispersa, *Duf.* On young Oak, Croghane, Killarney (Carroll). Not to be confounded with A. anastomosans, *Ach.* = Arthothelium dispersum, *Mudd.*

A. epipasta, *Ach.*,* A. excipienda, *Nyl. Sc.* 261. Torc Mountain (Carroll). What commonly passes passes for A. epipasta is merely a denuded form of A. astroidea, Ach.

Melaspilea ochrothalamia, *Nyl. in Flora*, 1865, *p.* 355. On the bark of young trees at the base of Mangerton, Sept. 1867 (Carroll). Spores 1-septate, dark brown, closely resembling those of Lecidea disciformis or myriocarpa. No paraphyses.

Mycoporum sparsellum, *Nyl. Coll. Lind.* 62. On Holly, Cromaglown, Sept. 1867, with Calicium diploellum (Carroll).

Verrucaria leptospora, *Nyl. in Flora*, 1864, *p.* 487. On Holly, Dinish, Sept. 1867 (Carroll). A fine species, originally found by Welwitsch in Portugal.

V. pyrenuloides, *Mut.*, *var.* Hibernica, *Nyl.* Investing stems of Hazel on Torc Mountain, Sept. 1867 (Carroll). This fine tropical Lichen resembles V. nitida in external appearance, but the thallus is much thicker, destitute of pellucid dots, and the apothecia are more or less clustered. Thallus continuous (not occurring in round patches), as if the entire stem were enveloped by a single plant. Spores large, murali-divisæ. V. pyrenuloides (*Mut.*) occurs in S. America, Java, etc., and (as well as Opegrapha diplasiospora and Mycoporum sparsellum) was collected in New Granada by Lindig. It is likely that several other American or South European forms may reward a really close investigation of the Killarney district.

V. conformis, *Nyl. in Flora*, 1864, *p.* 357. On Arbutus, Upper Lake, Killarney (Carroll). Perhaps a mere form of V. biformis, *Borr.*, but the perithecium is dimidiate, and the spores not 1-serial in the asci. This species (or *var.*), along with Lecidea ochrophora and Melaspilea ochrothalamia, were originally found at Brest, and, with Graphis Lyellii, Opegrapha lentiginosa, Verrucaria leptospora, etc., may be called West European forms.

Endococcus haplotellus, *Nyl.*, *n. s.* Parasitic on thallus of Opegrapha varia *v.* diaphora. Muckruss demesne, Killarney (Carroll). Spores very numerous in the asci, dark brown, 1-septate, exceedingly minute.

Thelopsis rubella, *Nyl.* On Holly, Dinish, Killarney, Sept. 1867 (Carroll).

ON THE PRESENT USE OF LICHENS AS DYE-STUFFS.

By W. Lauder Lindsay, M.D., F.R.S. Edin., F.L.S.

(*Read before the British Association*, 1867.)

Some years ago, when the Aniline colours were introduced as dyes, Technologists predicted with confidence the rapid disuse of Lichen-dyes,

on the ground of the superior beauty and permanence, as well as abundance and cheapness, of the former. In the Presidential Address of this Association at the Manchester meeting in 1861, Dr. Fairbairn remarked of aniline, "This important discovery will probably in a few years render this country independent of the world for dye-stuffs; and it is more than probable that England, instead of drawing her dye-stuffs from foreign countries, may herself become the centre from which all the world will be supplied." In the Museum of Economic Botany at Kew, which is the most important of its class in this country, it is stated that Orchill was *formerly* used for dyeing mauve and allied colours, and is so still, to a small extent; but the coal-tar and other colours *have* virtually *supplanted it*.

Again, Robert Hunt describes a dyeing liquor, prepared from sulphate of aniline, as capable of producing the delicate and "admired colours of Archill, and it has this great advantage over it, that it is not destroyed by light." A few years ago I was informed by the representative of one of the largest Glasgow calico-printing firms—a house that had spent some £10,000 or £12,000 on an aniline patent—that the great disadvantage or defect of Orchill is that it does not "stand." The hue is not permanent; it fades and becomes dim when exposed to light and air; while in gaslight it assumes a brown tinge. A muslin dress dyed with Orchill-purple soon gets brown in gas-lit rooms. It is not asserted that the aniline or other colours are superior in beauty, but they can be rendered more *permanent* by mordants. My friend described a rose-colour produced from the coal-tar colouring matter as then greatly admired and run upon; but it did not differ from what may be produced from *several* of the dye-lichens. All his practical evidence went to show that—

1. There is a fashion in *colours*, as in many other matters connected with dress.

2. At that time the coal-tar colours were in the ascendant; and

3. The only superiority of the latter colours over the Lichen-dyes lay in their superior *permanence*.

The object of my present communication is to show that all predictions regarding the *displacement* of Lichen-dyes by Aniline or other modern colouring matters, are at least premature. I confess that so satisfactory were the grounds upon which these predictions or assertions were based,—such the experience and reputation of the many eminent

authorities by whom they were made,—that for a time I tacitly accepted and acquiesced in their conclusions, and took it for granted, that both the commercial and domestic use of Lichens as dye-stuffs in England and Scotland,—that Orchill and Cudbear, "Orchella weeds" and "Crottles,"—would speedily be things of the past. But in the course of collecting materials for a work on British Lichenology, which I have in preparation,—more especially for the chapters on the tinctorial applications of Lichens,—I have in and subsequent to 1862 found, to my surprise, that there exists abundant evidence of a long future of usefulness for Lichen-dye-stuffs in this and other countries, both in commerce or manufacture on the large scale, and in the domestic arts on the small scale. In regard to their use in commerce, I am indebted mainly to visits to the International Exhibition of 1862, and to the Orchill manufactory of Messrs. Burton and Garraway, of Bethnal Green, London, in 1865, for the satisfactory evidence I have accumulated. But I have also gathered important corroborative information from the Jurors' Reports of the said Exhibition; from the papers read at previous meetings of this Association by Mr. Bedford, or other authorities engaged professionally in the manufacture of Lichen-dyes; and from other publications of similar character.

The general results of all my observation and inquiry include the following:—

1. That French colourists especially have devised new processes for insuring *permanence* of lichen-dyes, whereby they can quite compete, in this respect, with the aniline colours.

2. That new forms of Lichen-dyes have been patented, especially combinations of Orchill liquor, or its equivalent, with alkalies, or earths, in the form of *Lakes*.

3. That, while the older Dye-lichens have gradually been given up, new and more valuable tinctorial genera or species have been introduced.

4. That new markets have been opened up, new commercial sources found out, with the progress of geographical discovery and of colonizing settlements.

5. That the only visible effect of competition with other dye-stuffs has been greatly to reduce the market value of the "Orchella weeds."

6. That, so far from being superseded, the import of Dye-lichens and

manufacture of Lichen-dyes in Europe is, perhaps, now more extensive and more flourishing than ever.

7. That "French purple," Orchill, and Cudbear are successfully competing with the aniline and all other colours of their class hitherto introduced.

8. That the commercial sources of "Orchella-weeds" of the finest quality,—the varieties of *Roccella fuciformis*,—may yet be greatly multiplied; and are so far from being exhausted, that they cannot yet be said to be fully developed.

I propose limiting myself at present, for brevity's sake, to some *illustrations* only of the present use commercially of Lichens as Dye-stuffs.

Commercial Dye-lichens and Lichen-dyes.

At present the most interesting form of Lichen-dye,—that which is typical of the most recent substitutes for the more familiar Orchill and Cudbear of former times,—is what is denominated in this country *French purple*. This substance, which appears to be a lime- (or alumina-) lake of our common Orchill, was introduced to commerce by Messrs. Guinon, Marnas, and Bonnet, of Lyons, by whom it was exhibited in London in 1862. It has this great advantage over Orchills, that it is much faster and less sensitive to the action of acids, while it yields very fine and pure mauve and dahlia tints—especially on silks—without the use of mordants, properly so-called. To render it available, however, for dyeing, the lake must be decomposed, and the colouring matter set free by means of oxalic acid and ammonia. Professor Hofmann, of London, in his report on "Chemical Products and Processes," exhibited in London in 1862 (in the International Exposition), makes the strong statement, that "so far as regards *fastness* and resistance to the influence of light, *French purple* is certainly *not* inferior to aniline purple." The chief colouring-matters with which it has to compete are, besides the coal-tar dyes, cochineal, indigo-carmine, and ultramarine. But it appears to compete successfully; and there seems no reason to doubt that, with the progress of manufacturing chemistry, the Lichen-dyes will continue to hold their own permanently against these other colouring-matters which may, for the time, enjoy a higher reputation in the world of fashion. The manufacturing experiments of the French on the large scale have

proved that all the defects of Orchill, which may be regarded as the type of the more valuable class of the Lichen-dyes, may be remedied by simple chemical expedients. The great defect of Orchill has ever been its extreme liability to change under the influence of light and air, acids and alkalies, coal-gas, and other agents, to which dyed fabrics must be more or less exposed when made up in dress. The French have shown apparently that the beautiful purples and other hues of Orchill may be rendered *perfectly fast* or permanent; and if in this respect they are placed on a par with aniline and other colouring matters of similar shades, they have no cause to fear competition on the score of brilliancy, beauty, or variety. I saw it recorded in 1850 that "M. Clenchard, a French chemist, had recently patented a mode of using archil in the dyeing and printing of woollen and silk goods, in which the archil is combined with alkalies and lime, and applied to the woollen material with a more direct action than in the ordinary mode of its use." This seems to have been an intermediate stage in the production of French purple. Of the genus or species of Lichen used in the manufacture of that colouring-matter, I know nothing; but I doubt not it is one of the same "Orchella weeds" employed in this country in the preparation of Orchill and Cudbear. Nor am I prepared, even were it otherwise desirable, to give any information regarding the process of manufacture or application of the dye; though I have no reason to doubt that either differs essentially from what obtains in the cases of Orchill and Cudbear.

The majority of Lichens formerly used in the preparation of Orchill and Cudbear in Britain have been given up by manufacturers, who now import almost exclusively *Roccellæ*, or "Orchella weeds," from tropical or subtropical countries,—and, for the most part, corticolous forms affecting the coast districts only. Generally this has arisen from the superior reputation of the *corticolous Roccellæ*; but there seems to be a solitary exception in the case of *Parmelia perlata*, which Mr. Burton, of London, tells me has a very high reputation, but is, nevertheless, scarce, and almost unknown in the market. All the "Orchella weeds" known in European commerce, which have been submitted to me, are referable to forms of three variable and widely-distributed species,—*Roccella fuciformis*, Ach., *R. tinctoria*, DC., and *R. phycopsis*, Ach.,—none of which I regard as good species scientifically, the one passing gradually into the other. Of these, by far the most valuable is the

first, and especially the corticolous, Everniiform, narrow, or linear conditions thereof, which affect the bark and branches of *Dalbergia melanoxylon*, *Mangifera Indica*, and other tropical littoral trees.

The principal *geographical sources* of the "Orchella weeds" are in—

I. Africa. A. East coast and islands: Mozambique; Madagascar (Island); Zanzibar (Island); Mauritius (Island). B. West coast and islands: Angola; Benguela; Loango; Sierra Leone; Cape Verde (Island); Teneriffe (Island); Madeira (Island); St. Thomas (Island), Prince's (Island), Gulf of Guinea. C. South coast: Cape Colony.

II. South America. A. East coast: Brazil, Rio Janeiro. B. West coast; Chili, Valparaiso; Peru, Lima; Ecuador, Guayaquil. C. North coast and islands; Curaçao (one of the Antilles Islands). III. Asia. A. India and the Indian islands: Burmah; Bombay; Ceylon (islands); Timor (island).

Burton thus arranges the principal kinds, known at present in the London market, in the order of their commercial value:—1. Mozambique. 2. Ceylon. 3. Angola. 4. Lima, Bombay, equal. 5. Cape Verde.

In general terms, it may be stated that the finest tinctorial forms are *equatorial*, growing within the limits of 10° north and south of the Line; while the *Roccellæ* are both few in number and inferior in quality beyond 30° on either side of the equator. This excludes Europe and North America wholly, Asia in great measure, and the French provinces of Northern Africa—as commercial sources of valuable "Orchella weeds." These weeds are to be found greatly beyond the limits of 30° north and south; for instance, in the Cape Colony and on the Mediterranean shores, and they extend as far north as the Channel Islands, the southern coast and islands of England, and the Frith of Clyde islands in Scotland. But in Britain and other temperate countries they occur in insufficient amount to be of any practical value. Central or tropical Africa, and Southern America and Asia, with their respective islands, constitute a field of supply of the most valuable kinds, of which, as yet, only an insignificant portion has been rendered available. In the International Exhibition of 1862, samples of "Orchella weeds" from the following new commercial sources were shown: Ceylon, Central and Southern Africa, including Natal.

The principal European importers of "Orchella weed" appear at present to be the Portuguese, French, and English. The imports into

Europe are probably larger than at any previous period; but I have not had access to statistical details even relative to this country, and am therefore not prepared to state precisely to what extent such increase exists. It would appear, however, to have been coextensive with the multiplication of the geographical sources of supply; the discovery of the superior value of exotic forms; and the process of the various improvements in manufacture directed to the permanency of the dye. If we may be guided by the testimony of the various International Exhibitions, including and succeeding that of 1851, the Portuguese appear to give more attention to Dye-lichens than any other European nation. From her colonies—especially in Central Africa—the exhibits are invariably comparatively numerous, and the imports apparently comparatively large. In the Exhibition of 1862, Portugal showed "Orchella weeds" from Angola, Benguela, Mozambique, Cape Verde, St. Thomas's and Prince's Island in Africa, as well as from India (Panguin), and Timor (one of the Molucca Islands). In the present French Exhibition similar exhibits are made; while France stands second in her exhibits, showing characteristically, however, almost exclusively the Dyes manufactured from "Orchella weeds," the colorific principles of these weeds and their derivatives (*e. g.* Orcin, Orceine, and Orchelline). In the Paris Exposition there are also a few German and other exhibitors of Orchill or its extracts or derivatives; while Britain appears to be *un*represented either as regards dye-lichens or lichen-dyes.

It is of interest to botanists and chemists, as well as to manufacturers, that the latter have been led by experience to recognize very *different tinctorial qualities of the same species from different localities*, even of the same country or limited district (*e. g.* of Western Africa or Western South America), and still more from different countries (*e.g.* Africa and South America). For instance, the same species—some one of the varieties of *Roccella fuciformis*—which from Mozambique sells at £50 per ton, from Ceylon fetches only £20 to £30. Unfortunately, manufacturers have also found that it is *impossible to foretell or estimate the colorific value* of any new sample of "Orchella weed" by any series of chemical or other experiments on the small scale. In all cases of purchase of new samples, tests on the small scale are applied, but they are never relied upon. Colorific value can be determined only by manufacture on the large scale; and, as this is an experiment

that may involve heavy pecuniary loss, and implies a great commercial risk, it is not surprising that new materials and new processes are adopted with unusual tardiness or caution. This experience of manufacturers is opposed to the views of chemists and botanists, both of whom appear to have firm faith in the trustworthiness of tests of colorific value applied on the small scale. The best-known of these tests in this country are the hypochlorites of lime or soda as recommended by Dr. Stenhouse, of London. The former has lately been adopted by the distinguished lichenologist Dr. Nylander, of Paris, who expresses himself in the following very strong terms of the simple application of a drop of solution of hypochlorite of lime on a glass stirrer to any given sample of "Orchella weed:"—"Thus are we enabled to say what is the quantity of this colourable matter, which the different species of the genus contain, it being, in fact, a sort of *immediate analysis*." The results of my own experiments on the colorific properties of Lichens, which were published between 1853 and 1855, as well as of certain other more recent experiments not yet published, lead me to agree with the manufacturers, and not with lichenologists and chemists.

In British commerce and in British manufacture Orchill occurs as a *liquor*—concentrated or not—and as a *paste*, of various shades of red and blue, with the intermediate gradations of purple and violet. While Orchill has, of late, been apparently less used than formerly in this country in the colouring of silk, cotton, and woollen goods, it seems to have been more and more largely applied to the dyeing of carpets and leather with shades of brown and maroon, as well as mauve and magenta. While Orchill is the form usually employed by professional dyers, *Cudbear* is that generally used in domestic dyeing. I found, for instance, that the latter is still largely imported into, and used in, the Hebrides, Orkney, and Shetland for the dyeing of home-made yarn. *Cudbear* appears to be prepared from the same sources as Orchill: from which it differs only in that it contains powdered lichen as well as its red extracted colouring-matter, the latter requiring to be dissolved out, by boiling, for use.

The market value of "Orchella weeds" has fallen from £300 to £70 or £30 per ton,—a circumstance which is attributable on the one hand to competition of Orchill with the coal-tar and other abundant and cheap colours of home production, and on the other to the now nume-

rous sources of supply, and media or centres of export and import. Dr. Stenhouse writes me, "You are probably aware that the coal-tar colours have greatly diminished the value of Lichens as dyeing substances;" and there seems a prevalent impression among chemists and manufacturers that the deterioration in market value to which I have referred is attributable solely to the disadvantageous competition of Orchill with aniline. To me it appears much more clear that there has been an increased demand for, and an increased supply of, "Orchella weeds," and the usual sequel of reduction of price,—with the progress of commercial tinctorial enterprise.

Dr. Stenhouse long ago recommended that the importation of the somewhat bulky Dye-lichens themselves should be superseded by that of their colorific principles or acids only; and Professor Hofmann, in his report already alluded to, speaks of the new mode of extracting these colorific principles as one of the most important improvements in this branch of manufacture. He refers especially to the economy and facility of manipulating a comparatively small bulk of material during the most important stage of manufacture. The plans and processes thus suggested and recommended do not, however, as yet appear to have been adopted by manufacturers or importers, or to have been even tried at all upon the large scale so far as I am aware—a circumstance which may be due to the striking difference or discrepancy already indicated between operations on the large and small scale, and the impossibility of founding upon the latter inferences or rules for guidance in the former. This conservative inaction, however, shows, I think, that in this country, at least, the manufacture of Lichen-dyes has not reached perfection; and that if, with all its imperfections of manufacture, Orchill can successfully compete with aniline, whose preparation and applications are much more highly scientific, it has little reason to fear competition in the future when applied chemistry lends its important aid to its proper production.

NOTE ON A CRITICAL CHINESE GRASS.

By H. F. Hance, Ph.D.

In the month of May, 1864, Mr. Sampson detected, growing in considerable abundance, in deep pools amongst the low undulating

hills around Canton, a Grass, which I subsequently distributed to various herbaria, with the doubtful determination of *Chamæraphis aspera*, Nees ?, adducing, also with doubt, as a synonym the *Pseudoraphis Brunoniana*, Griff. Mr. Bentham, however, informs me, on the authority of Colonel Munro, that Griffith's plant is *C. depauperata*, Nees, and he is inclined to think mine is *C. hordeacea*, R. Br. I may be allowed to observe, however, that the Canton plant has not at all the "thyrsus simplicissimus, bipollicaris, *Hordeum distichum* referens," assigned by Steudel (Synops. Glumac. 49) to R. Brown's species, nor does it agree better in inflorescence with the detailed description given by Kunth, from Brown's own specimens, in the supplementary volume of his 'Agrostographia.' On the other hand, it has a "panicula terminalis, ovata, *effusa*, subglabra, inferne subexcavata, floribus 1 v. 2 infimis sessilibus, in excavationibus nidulantibus, superioribus stipitatis, stipite ultra florem terminalem in aristam subulatam denticulatam flore duplo longiorem producto denticulato scabro, denticulis antrorsis," as Griffith describes (Notul. ad Pl. Asiat. pt. iii. p. 29). That author states the upper florets to be stipitate and usually solitary, but in his figure (Ic. Pl. Asiat. pt. iii. t. 145, "*Panicum Brunonianum*") the lower and middle radioles are depicted with usually two distant spikelets; the upper with one only, all sessile or subsessile, and this is nearly always the case with the Chinese Grass, though the middle branches have sometimes 3–4 spikelets. The plate itself might, so far as accuracy is concerned, have been drawn from my specimens.

I possess, from Dr. Thwaites, examples of *C. aspera* (C. P. 3846) and *C. depauperata* (C. P. 3857),—the determinations having, I doubt not, been verified at Kew. The latter, with its dense, spiciform, barley-like panicle, with short, 1-spikeleted, appressed rays, is altogether unlike Griffith's plate; the former differs from the Canton Grass by a rather more robust habit, laxer vaginæ, extreme scabridity of them and the leaves (which, except at the margins, are smooth in my plant) less patent and very flexuose panicle-rays, bearing sometimes as many as 12 approximate, usually overlapping, not distant spikelets. I cannot, therefore, help suspecting that Mr. Bentham's opinion has arisen from some misconception, and that the Canton and Bengal plants are identical; and if, as seems to be the case, we have here a new species, holding a middle station between *C. aspera* and *C. depauperata*, it might well bear the name of *Panicum (Chamæraphis) intermedium*,

given to it in the above quoted place by its first discoverer, Mr. Griffith. I may add that Dr. Thwaites, who received the Chinese plant from me just at the very period when *C. aspera* was discovered in Ceylon, was disposed to think the former a mere variety of it.

Whampoa, 6th Nov. 1867.

SERTULUM CHINENSE: A DECADE OF INTERESTING NEW CHINESE PLANTS.

By H. F. Hance, Ph.D., etc.

1. *Naravelia pilulifera*, n. sp.; ramulis inflorescentiaque tenuiter tomentellis, foliolis e basi cuneato-rotundata ovatis obtusiusculis apiculatis præter nervos strigillosos glabratis, petalis 9–12 patentibus filiformibus corpusculis solidis oblongo-subglobosis coronatis viridibus.—In silvis densis ad fauces Tsing-yune dictas fl. North River, prov. Cantoniensis, d. 18 Septembris 1866, coll. Sampson et Hance (Exsicc n. 13748).

A very interesting species, closely allied to *N. Zeylanica*, DC., but quite distinct by the remarkable capillary petals, exceeding the stamens, and terminated by solid roundish heads about $1–1\frac{1}{4}$ line in length, so that they look like pins stuck round the flower.

2. *Cardamine paradoxa*, n. sp.; radice fibrosa, caule erecto $1–1\frac{1}{2}$-pedali glabro profunde sulcato, foliis glaberrimis inferioribus longe superioribus sensim brevius petiolatis 3-foliolatis foliolis amplis petiolulatis lateralibus basi truncatis v. subcordatis ovatis terminali sæpe ovato-lanceolato v. lanceolato basi cuneato longius petiolulato obtusiusculis crenato-serratis venis primariis in denticulos excurrentibus, floribus in racemos graciles multifloros paniculam terminalem efformantes digestis, sepalis petalisque albis inter se æqualibus his unguiculatis oblongis, pedicellis erecto-patentibus floribus æquilongis, siliquis in specimine immaturis subbilinealibus stipitatis ellipticis utrinque acutis compressis mono- vel rarius 2–3-spermis stylo iis triplo breviore suboblique rostratis, stigmate minuto capitato, seminibus ovalibus compressis.—Ad os magnæ speluncæ necnon in rupe calcarea Kai-kun-shek, secus fl. West River, prov. Cantoniensis, d. 27 Maii 1867, detexit insomnis Sampson. (Exsicc. n. 13844.)

After full consideration I do not think that this plant, which is remarkable by its elliptic, usually 1-seeded silique, can be regarded otherwise than as a somewhat aberrant *Cardamine;* for, in the first place, the foliage is precisely similar to that of *C. Africana*, L., and secondly, the American *C. rotundifolia*, Mx., not unfrequently has a much abbreviated fruit; whilst all botanists are familiar with the great differences in this respect between very close relatives in the allied genus *Nasturtium*, especially in the section *Brachylobos*,—as, for instance, *N. terrestre*, R. Br., and *N. Niloticum*, Boiss.

3. *Pterospermum (Velaga) heterophyllum*, n. sp.; arbor 40–50-pedalis, ramulis petiolisque rufo-tomentosis, foliis arboris juvenilis atque turionum peltatis basi conspicue truncatis circumscriptione subsemiorbiculatis profunde 5-palmatis 8–11-nerviis 9–12 pollices diametro petiolo limbo subæquilongo suffultis reliquis basi obliquis rotundatis truncatis vel obscure cordatis 4–6-nerviis nervis infimis marginalibus ac præterea costulatis nervis omnibus subtus prominulis oblongis v. ovato-oblongis integerrimis caudato-acuminatis supra glaberrimis subtus dense fulvescenti-tomentosis 3–7-pollicaribus petiolo semipollicari haud peltatim affixo suffultis, stipulis oblongis acutis petiolo parum brevioribus (floribus non visis), capsula crasse stipitata cylindracea acuta 2½ poll. longa furfure rufo dense tomentosa, seminibus superne in alam iis triplo longiorem productis in quovis loculo quaternis.—In silvis densis circa cœnobium buddhisticum Fi-loi-tsz, prov. Cantoniensis, d. 18 Sept. 1866, detegerunt Sampson et Hance. (Exsicc. n. 13743.)

I am very imperfectly acquainted with this genus, but the Indian peninsular species have been so well and carefully described by Wight and Arnott, that there can be little doubt of the present one being distinct; and, though Miquel has unfortunately given very incomplete diagnoses of the Archipelagic species, it seems equally to differ from any of them.

4. *Abrus Cantoniensis*, n. sp.; diffusa, 1½–2-pedalis, ramulis petiolisque strigoso-pilosis, foliis 8–11 jugis foliolis oblongis v. obovoideis obtusis setaceo-apiculatis 2½–4½ lin. longis 1½–2¼ lin. latis utrinque elevato-reticulatis supra parce pilosulis subtus appresse strigosis, racemis axillaribus brevibus, floribus 3-linealibus rubellis vexilli ungue limbo 4-plo breviore vaginam stamineam semiamplexante, leguminibus oblongis compressissimis pilosulis 4–5-spermis.—Ad radices montium

Pak-wan, prope Cantonem, m. Augusto 1866, coll. T. Sampson. (Exsicc. n. 13417.)

Though this very natural genus is always described as exstipellate, yet, in the present species, in the common *A. precatorius*, L., and in the North Brazilian *A. tenuiflorus*, Spruce,—the only ones at my disposal,—I find at the base of each short petiolule, and closely appressed to the raised margin of the grooved petiole, two minute, free, setaceous processes, which it appears to me are certainly true stipellæ.

1255 5. *Casearia (Iroucana) membranacea*, n. sp.; undique glaberrima, ramulis subangulatis, foliis oblongo-lanceolatis acutis v. obtusis in petiolum brevem cuneato-attenuatis margine repandulis v. obsolete paucicrenatis membranaceis creberrime pellucido-punctatis et lineolatis vix lucidulis valde subtiliter elevato-reticulatis $2\frac{1}{2}$–4 poll. longis $1\frac{1}{4}$–2 poll. latis petiolo trilineali, floribus e tuberculis axillaribus solitariis paucisve pedicello petiolo æquilongo suffultis 5-partitis margine ciliatis, staminibus 8, staminodiis villosissimis, ovario glabro 3-placentato, stigmate crasso medio perforato, fructibus flavis ovoideis 8 linealibus, seminibus semiovoideis marmoratis.—In fruticetis prope Kiéng-cháu, metropolin ins. Hae-nan, d. 18 Nov. 1866, coll. T. Sampson. (Exsicc. n. 13669.)

This seems different in the texture of the leaves and other characters from any Indian or Ceylon species, and, so far as I can judge from descriptions, from the Archipelagic ones enumerated by Miquel. I have seen no Asiatic *Casearia* with such thin leaves.

4817 6. *Pimpinella (Petrosciadium) Sinica*, n. sp.; radice e fibris crassis conflata, caule circ. 4-pedali erecto striato pilis crispulis articulatis breviter tomentoso superne ramoso foliis papyraceis pubentibus radicalibus caulinisque inferioribus longe petiolatis exacte cordatis grosse dentatis petiolis basi amplexanti-vaginatis superioribus nunc cordatis petiolis sensim brevioribus sæpius vero trifoliolatis foliolo terminali longius petiolulato trisectisve segmentis ovatis basi cuneatis v. truncatis, umbellis 7–12-radiatis, involucri phyllis circ. 5-linearibus nunc apicem versus 1–2 dentibus auctis radiis ipsis 4–5-plo brevioribus, involucelli phyllis similibus radiis dimidio trienteve brevioribus, petalis albidis obovato-subrotundis apice emarginatis lacinula inflexa extus pilis raris articulatis obsessis, fructibus brevissime glanduloso-pilosis, stylopodio crasso, stylis divergentibus demum reflexis.—Inter gramina, solo arenoso, ad angiportum Tsing-yune, fl. North River, prov. Cantoniensis.

d. 18 Sept. 1866, necnon in devexis montium Pak-wan, supra Cantonem, m. Augusto 1867, coll. Sampson et Hance. (Exsicc. n. 13739.)

The nearest ally of this appears to be the *P. Javana*, DC., but it is evidently very distinct, as well from the description as from Miquel's plate. (Flor. Ind. Batav. i. t. x.)

7. *Galium miltorrhizum*, n. sp.; radicibus crebre fibrosis rubris, caulibus erectis ramosis glaberrimis acute quadrangulis, foliis quaternis 4–6 lineas longis oblongis obtusiusculis v. acutis uninerviis glabris v. setulis albis scabridis conspersis margine costaque subtus setulis antrorsis aculeolatis cymis terminalibus et axillaribus brevibus paucifloris erectis, pedicellis fructiferis divaricatis, floribus parvis, corollæ albidæ lobis obtusis, fructibus parvis glabris.—In collibus circa oppidum Amoy, ipse legi, m. Octobri 1857. (Exsicc. n. 1455.)

Although I have compared this with a great number of species, including all recorded from Eastern Asia, (which have mostly been carefully worked up lately by Von Heder), and even with the very rare *G. gracile*, Bge., and *G. trachyspermum*, A. Gr., it appears perfectly distinct, nor am I able to say with any confidence what are its precise affinities. Like *G. saccharatum*, All., *G. tataricum*, Trev., and others, the root stains the herbarium-paper red.

8. *Adina rubella*, n. sp.; frutex compactus, ramulis ultimis pubescentibus, foliis subsessilibus ovato-lanceolatis v. oblongis acutiusculis costulatis costulis subtus prominulis supra glaberrimis subtus minutissime glandulosis 5 lin.–1½ poll. longis 2–8 lin. latis, pedunculis in axillis foliorum superiorum solitariis folia superantibus rigidis pubescentibus ebracteatis, floribus purpureo-roseis.—In provincia Cantoniensi, secus fl. West River, Junio 1864; ad fauces Tsing-yune et alibi secus fl. North River, m. Septembri 1866, coll. Sampson et Hance. (Exsicc. n. 11229.)

This interesting addition to a very small genus may be recognized at once as specifically distinct from *A. globiflora*, Sal., by its dense bushy habit, much darker foliage, more prominent and closely placed primary veins, thicker rigid bractless peduncles, and rosy blooms. I cannot detect the slightest difference in the structure of the flowers, fruit, or seed. The leaves vary much in size and shape on different individuals. It is a very neat plant when growing. I distributed it formerly with a label marked *Cephalanthus?*, not having then examined it.

9. *Vitex (Euagnus) Sampsoni*, n. sp.; crispulo-pilosa, ramis compresso-tetragonis, foliis petiolo iis æquilongo supra canaliculato suffultis 3–5 foliolatis foliolis cuneato-spathulatis postice integerrimis supra medium utrinque 3–5 serratis acutis subtus pallidioribus opacis reticulato-venosis infimis dum adsint semper integerrimis abbreviatis, cymis brevipedunculatis in paniculas simplices axillares et terminales interruptas dispositis, calyce ad medium usque acute 5-fido, corolla calyce triplo longiore extus albo-pilosa, genitalibus exsertis.—Ad vias prope Ting-ú-shán, prov. Cantoniensis, d. 26 Maii 1867, coll. cl. Sampson. (Exsicc. n. 13841.)

The leaflets are in size and shape precisely like the leaves of *Lippia nodiflora*, Rich.

10. *Ophiopogon (Flueggia) umbraticola*, n. sp.; foliis linearibus subsesquipedalibus 1–1½ lin. latis acutiusculis subquinquenerviis margine spinulosis scapum ancipitem parum superantibus basin versus angustatis margineque albo hyalino celluloso ipso folio plus duplo latiore præditis, scapo usque ad medium nudo stricto, racemo flexuoso laxifloro, floribus albidis 3-fasciculatis secundis cernuis 2 lineas longis, pedicellis 4–6-linealibus medio v. paulo supra medium articulatis et incrassatis, bracteis lanceolato-subulatis inferne hyalino-marginatis dimidium pedicellum æquantibus.—In alveis torrentium umbratis, necnon in silvis opacis, ad devexa orientalia faucium Tsing-yune, fl. North River, prov. Cantoniensis, d. 19 Septembris 1866, coll. Sampson et Hance. (Exsicc. n. 13759.)

Though *F. Wallichiana*, Kth., and *F. intermedia*, Kth., are the only species of this group known to me, it seems clear, from Kunth's careful detailed description, that the above plant is new, differing from *F. japonica* by its shorter leaves, flexuose raceme, and long pedicels, jointed in the middle; and from *F. jaburan* by its much narrower, 5-nerved leaves, flexuose raceme, and fewer-flowered fascicles. Dr. Thwaites reduces, very likely with reason, *F. Wallichiana*, *F. intermedia*, and *F. dubia* to one species, and he even hesitates as to the distinctness of *F. Japonica*. The Chinese plant is certainly quite distinct from the two Indian ones I have seen. I do not regard *Flüggea* as generically distinct from *Ophiopogon;* but, if both genera are admitted, it would be better to retain Loureiro's older name of *Liriope* for *O. spicatus*, etc., and that of *Ophiopogon* for the group represented by *O. Japonicus*, as this is the original *Riuno Fige* or "Snake's-beard" of the Japanese.

Flueggia of Willdenow, (reduced to *Securinega* by J. Mueller of Aargau), has five years' priority over Richard's homonymous genus.

ENUMERATION OF THE PRIMULACEÆ, PITTOSPOREÆ, AND IRIDEÆ, COLLECTED DURING THE YEARS 1855–1857 IN HIGH ASIA, BY MESSRS. DE SCHLAGINTWEIT.

By Dr. F. W. Klatt.

(Plate LXXVIII.)

The plants enumerated below were collected by Messrs. de Schlagintweit principally on their way to the mountain regions of Northern India. In the Indian peninsula their travelling being more rapid, and the country traversed well explored, botanical collections were made only in localities of special interest in a topographical or geological point of view.

To every specimen, locality, heights, and numbers are added. The heights are given either for the station, as such, or for the upper and lower end of the line along which the collection was made on the respective occasions. In general, where the limits are pretty distant from each other, the plant may be considered also as spread in greater abundance. All the heights—in English feet—are absolute, referring to the level of the sea. The full details of the different "stations of height" is given in the second volume of the travellers' publications (where 3495 stations could be collected, of which the authors themselves had occasion to measure 471 in India, 804 in High Asia). The "numbers" given, refer to the original ticket in the 'Herbarium Schlagintweitianum.'

The material examined comprise 23 species of *Primulaceæ*, 1 *Pittosporea*, and 8 *Irideæ*, with 1 new species of *Primula* (*P. Telemachica*, F. W. Klatt), and a number of important varieties in most of the other species. The great elevation at which *Primulaceæ* and *Irideæ* were found, must be particularly mentioned, viz. *Primula pusilla*, Wall., at 16,905 feet; *P. minutissima*, Jacq., at 16,186 feet; *Androsace lanuginosa*, Wall., and *Iris Nepalensis*, Wall., at 16,500 feet; and *Iris fragrans*, Lindl., at 16,500 feet.*

* The highest phanerogamic plants in the Andes, found on the slopes of Chimborazo by Colonel Hall, reached only 15,769 feet. In the central parts of

For a height of 16,500 feet in the different parts of the mountain system, the following annual mean temperatures are resulting from the data obtained by Messrs. de Schlagintweit:—*

	Annual mean temp. at 16,500 feet.
Himalayan borders facing India	32° F.
Interior of the Himalaya, southern slopes	29½° F.
Western Tibet, northern slopes of the Himalaya, and Karakorum chain	31° F.
Künlün, both slopes of the crest, and borders facing Central Asia	20½° F.

In reference to these mountain-systems and their climate, Mr. Hermann de Schlagintweit-Sakünlünski has communicated to me the following data; these are taken from the large work entitled 'Results of a Scientific Mission to India and High Asia' (Leipsic, Brockhaus; London, Trübner), of which four volumes in quarto and forty-six plates of the atlas of panoramas, views, and maps, are now published. The following abstract, appearing for the first time in an English journal,† may be useful in reference to many a question of botanical geography.

"High Asia is the mountainous region extending from Bhutan in the east to Kabul in the west, and, in the northerly direction, from the tarais along the southern foot of the Himalaya on the Indian side, to the northern foot of the Künlün, where a wide depression separates the High Asiatic mountainous system from those following in Central Asia, and further to the north. In geographical degrees, the limits of this territory are the following:—Latitude, north, from 28° to 37°; longitude, east, Greenwich, from 72° to 95°. Fully to estimate such an extent of territory, it may be sufficient to keep in mind the Alps; from Avignon to Vienna, for instance, there is a difference of 12° of longitude; the breadth of the Alps, in latitude, does not even amount to a difference of 4°; the surface covered by the Alps is only one-tenth of the basis of High Asia."

High Asia, however, Messrs. de Schlagintweit found the highest point at which phanerogamic plants occur to be 19,809 feet above the sea; this was on the Jbigamin Pass in Western Tibet, and 19,237 feet on Gunshankaz, in Gnari-khorsum.—'Results,' vol. ii. p. 501.

* 'Results,' vol. iv. p. 548.

† A short notice, in French, was given in Meissner's 'Mém. sur les Polygonées, les Thymelées, et les Laurinées,' of the Herbarium Schlagintweit., in Ann. Sc. Nat. 5 sér. t. 6, cat. 6, pp. 1–27.

"Though the variation in topographical configuration is, necessarily, very great in mountain systems of such dimensions, three principal chains predominate throughout—the Himalaya, the Karakorum, and the Künlün. The central chain it is, the Karakorum, which forms the watershed to the north of the Himalaya, not the Künlün, as it had been supposed till then, and as one finds it still traced in most maps. The existence, indeed, of the Karakorum as a chain, about parallel to the Himalaya, and exceeding it in the average height of its crest, was perfectly unexpected, even to me and my brothers, and when already in Tibet, before we, as the first, crossed the Karakorum and the Künlün. Native information is of remarkably little use in such cases; first of all, since mathematical instruments are absolutely necessary for arriving at accurate general conclusions, and, not less, since such natives only are good judges of nature who have attained already a pretty high degree of culture; when this is not the case, natives either exaggerate features and phenomena of nature, or are altogether unacquainted with them."

"To the north of the three chains I first advanced in 1856, then accompanied by my brother Robert. My brother Adolphe did the same on a somewhat different route in 1857, and he advanced even as far north as Kashgar; but there, on the 26th August, 1857, he was barbarously assassinated. Six years later, in the winter of 1863–4, a native assistant was sent to Yarkand by Captain Montgomerie, Superintendent of the North-Western Departments of the great Trigonometrical Survey; the man, though an Indian native and Mussulman, was also killed, but his papers, and finally, those of my poor brother, were saved. I have not yet seen any numerical geographical data obtained by the expedition of Mr. Johnstone to Elchi in 1865. The principal results we had obtained, viz. that the Karakorum is the dominating chain of High Asia, running nearly parallel to the Himalaya, and that its drainage discharges itself to the north by depressions in the Künlün, in remarkable analogy with the southern discharge round and across the chain of the Himalaya—has been corroborated by the progress of the detailed survey."

"In reference to the distribution of the plants, it has to be mentioned, that Tibet is not to be considered as a plateau, but as a longitudinal valley, drained to the west by the Indus and Satlej, to the east by the Dihong; the central separation is situated in Gnarikhor-

sum, in the environs of the lake Mansaraur. Though the valleys are high, the relative height up to the chains and summits is still very great; we have but to remember that the passes generally exceed 18,000 feet, and that of the peaks, the Dapsang Peak, the second in height on the globe * as yet known (lat. north, 35° 28′; long. east, Greenwich, 77° 10′; height, 28,278 feet), is situated in Nubra, in western Tibet. A regular plateau we only met with immediately to the north of the Karakorum chain, where, over a large extent, the country is absolutely uninhabited, and not even visited as pasture-ground; we once travelled twenty-one days without seeing a tent or a man."†

"*The character of the climate* in the different parts of High Asia may shortly be defined by the following data:—‡

"1. For the mean decrease of temperature with height, I obtained, as the result of a very great number of observations, 390 English feet for 1° F. The decrease of temperature with latitude is analogous to that in Central Europe, viz. 2° F. for 1° of latitude, but, for general comparison, it is to be taken into consideration, that the region of High Asia, when the isothermal lines are reduced to the level of the sea, decidedly shows a decrease of temperature in the direction from west to east.

"2. The conditions of atmospheric moisture are unusually irregular over the different parts of High Asia. In Tibet the annual amount of rain varies between two and six inches only, whilst in Sikkim, in the eastern Himalaya, it exceeds 120 inches a year. This is of special importance with regard to the vegetation; also the difference "in relative humidity of the atmosphere" was also found much greater than the few data known till then might have allowed us to expect. In Tibet we frequently had a dryness so great that we obtained but $1\frac{1}{2}$ per cent., even 1 per cent. only of relative humidity,§ whilst 16 per cent., determined by Humboldt,‖ was the greatest dryness observed till

* As the peaks next in height, but more than 900 miles distant, I add Gaurisankar, in Nepal, 29,002 feet, the highest of all; Kanchinjinga, in Sikkim, 28,156 feet, the third in height till now.

† Details are given, together with my view of the Künlün chain, in the explanatory print of Plate XXIX. of the Atlas.

‡ 'Results,' vol. iv. pp. 546–553; for the Alps I had obtained 320 feet for 1° F. (Phys. Geog. of the Alps, vol. i. pp. 334–370.)

§ 'Results,' vol. iv. p. 29.

‖ 'Asie Centrale,' German edition, vol. ii. p. 51.

then; and this, too, in the eastern parts of Asia, but in regions very low, and far north of our regions of Tibet and Turkistan."

The sign Δ before a name indicates an uninhabited place, or a pasture-ground only occasionally visited by nomadic tribes, generally are designated as "Deras."

PRIMULACEÆ.

1. *Primula petiolaris*, Wall.; De Cand. Prod. viii. p. 37; Wall. Fl. Ind. ii. p. 22; but the variety, which is named by Wallich *P. nana*. —N. 9770, from the Western Himalaya, province of Kamaon, locality Bageser to Munshari, *viâ* Kathi and Namik, 5000–7800 feet; collected May 24–31, 1855.

2. *P. purpurea*, Royle; De Cand. l. c. p. 40; Royle, Ill. 311. t. 77. f. 2.—N. 9772 and n. 9840 partly. Western Himalaya, province of Kamaon, locality Bageser to Munshari, *viâ* Kathi and Namik, 5000–7800 feet, collected May 24–30, 1855; and Δ Roghas up the Milum glacier to Δ Bitarguar, 13,995–14,594 feet, collected June 18th and 19th, 1855.

3. *P. Moorcroftiana*, Wall.; DC. l. c. p. 45. There is only one imperfect specimen, showing only the foliaceous involucels, and the umbel. Involucel or leaflets ovate-lanceolate, acuminate, connate at their broad bases, on the margins sharply dentate, and above very mealy. Pedicels elongated with farina under the calyx. Calyx-segments farinaceous, ovate-lanceolate, acute, keeled, connected to the middle equal in length with the capsules.—N. 9027. Found in the Western Himalaya, province of Garhval, locality Sukhi, across the Bamsuru and Chaia Pass to Kharsali (Passes between the Bhagirathi and Jamna valleys), 9000–15,400 feet; collected October 9–13, 1855.

4. *P. rosea*, Royle, Ill. 311. t. 75. f. 1; De Cand. l. c. p. 41.—N. 1705, Tibet, province of Ladak, locality Le to Δ Kurumpulu (on the southern slopes of Laoche Pass), 11,500–15,470 feet, collected July 24, 1856; n. 1899, environs of Le in general, 10,750–12,500 feet, collected July to September, 1856; n. 1943, locality Yugu to Le (right side of the Indus valley), 11,000–12,000 feet, collected August 1–31; province of Nubra, locality Kardong to Diskit, on the left side of the Shayok, 12,878–9968 feet, collected July 26–28, 1856; n. 5296, province of Balti, locality Chorbad-la Pass to Δ Chungaks, on the northern foot of the Pass, 16,976–15,000 feet, collected July 8,

1856; n. 3838, Western Himalaya, province of Kishtvar, locality Triloknath up the Kali Pass (south-west of Triloknath), about 7000 feet, collected June 24–27, 1856; n. 9840, partly, province of Kamaon, locality Δ Roghas up the Milum glacier to Δ Brarguar, 13,995–14,594 feet, collected June 18–19, 1855; n. 12,367, province of Kulu, locality Δ Ralha up to Rotang Pass (southern slopes of the Rotang Pass), 8700 to 13,061 feet, collected June 9, 1856.

5. *P. (Aleurita) Telemachica*, F. W. Klatt.—Root fleshy, thick, fibrous. Leaves ovate-lanceolate, acute, wrinkled; underneath closely, roughly, and perspicuously veined, on the edge densely glandulous and fimbriated, tapering towards the sheathing base. Leaves surrounded by leaf-like, broad, ovate, spathulate scales, which underneath towards the point are purplish, and on the midrib as well as on the margin glandulous and fimbriated. Scapes erect, round, longer than the leaves. Involucral leaflets longer than the pedicels, ovate-lanceolate, concave, at the base embracing the scape, on the top long pointed. Calyx angular, short, 5-cleft; segments acute, orange-coloured towards the point. Tube of corolla cylindrical, longer than the calyx. Limb consisting of 5 obcordate, deeply-incised lobes.—This species much resembles *P. elegans*, Duby, but the last is quite glabrous, has long pedicels, no scales, and differently-shaped involucels. N. 13,085, Central Himalaya, province of Nepal, locality environs of Kathmandu, height 5000 to 7000 feet, collected March 4–8 1857. The annual mean temperature in this region is 55° to 60° F.; the amount of rain about 60 inches a year, chiefly varying with the distance from the sea.

The name "*Telemachica*" was chosen in due acknowledgment of the zeal of the travellers, for being the same in meaning as their own; at the same time, it may serve to draw attention to a remarkable instance of identity of name in ancient Greek and German.

6. *P. obtusifolia*, Royle, Ill. p. 311. t. 77. f. 1; De Cand. p. 42.—N. 5698, Tibet, province of Balti, locality Khapalu (on the left side of the Shayok), 8285 feet, collected July 12, 1856; n. 9646, Western Himalaya, province of Kamaon, locality environs of Milum (chief place of the district Johar), 11,200–12,100 feet, collected June 6–25, 1855; n. 12,102 and n. 12,107, province of Kulu, locality top of Rotang Pass (Pass between Kulu and Lahol), 13,061 feet, collected June 9, 1856.—The plants are very different in height, varying from 4–12 inches.

7. *P. pusilla*, Wall. Fl. Ind. ii. p. 22.—N. 5321, Tibet, province of Balti, locality Δ Tsoka; highest point reached on the right side of the Chorkonda glacier, 16,905 feet, July 29, 1856.

8. *P. minutissima*, Jacquem.; De Cand. p. 42, and Duby, Mém. sur la Famille des Primulacées, t. 1. f. 3.—N. 2930, Western Himalaya, locality top of the Bara Lacha Pass, 16,186 feet, collected June 19, 1856.

9. *P. involucrata*, Wall. Cat. n. 7107; De Cand. p. 42.—N. 3856, Western Himalaya, province of Kishtvar, locality Tiloknath up the Kali Pass (south-west of Tiloknath), about 7000 feet, collected June 24–27, 1856; n. 9605, province of Kamaon, locality environs of Milum (chief place of the district Johar), 11,200–12,100 feet, collected June 6–25, 1855; n. 9785, locality Bageser to Munshari, *viâ* Kathi and Namik, 5000–7800 feet, collected May 24–31, 1855; n. 5264, Tibet, province of Ladak, locality Δ Yuru Kiom, *viâ* Kanji up to the Tinti-la Pass, 12,790–15,548 feet, collected July 2, 1856; n. 7032, province of Gnari Khorsum, locality Δ Laptel to Δ Selchell and Δ Hoti (south of the Satlej), 13,900–16,200 feet, collected July 16–19, 1855; n. 12,740 and 12,741, Künlün, province Khotan, locality Δ Sumgal (on the southern foot of the Bushia Pass) to Δ Gulbagashen (large Yashem quarries), 13,215–12,252 feet, collected August 28–30, 1856.

10. *P. denticulata*, Smith (De Cand. p. 44); Wall. Fl. Ind. ii. p. 17; Smith, Exot. Bot. ii. p. 109. t. 114; Bot. Reg. xxviii. t. 47. This species is found in a very different state and size, with scapes from 6–12 inches, and leaves from 6–15 lines, and in some specimens the leaves are somewhat similar to those of *P. elliptica*, Royle. But *P. denticulata*, Sm., has always a membranaceous calyx, with dark teeth; the tube of the corolla is enlarged towards the mouth, not equal in length to the calyx, the leaves are rather hairy, the umbel is many-flowered, and the involucels are broad-ovate or ovate-lanceolate.—N. 5026, Western Himalaya, province of Simla, locality environs of Simla, 6000–7300 feet, collected March 20 to April 10, 1856; n. 9603 and 9673, province of Kamaon, locality environs of Milum (chief place of the district Johar), 11,200–12,100 feet, collected June 6–25, 1855; n. 9773 and 9812, locality Bageser to Munshari, *viâ* Kathi and Namik, 5000–7800 feet, collected May 24–31, 1855; n. 9841, locality Δ Roghas up the Milum glacier to Δ Bitarguar, 13,995–14,594

feet, collected June 18 and 19, 1855; n. 9970, locality above the limit of shrubs in the Pache valley (environs of Milum), 15,600 feet, collected June 10, 1855; n. 6093 and n. 6095, Tibet, province of Balti, locality Δ Chogosbang above Δ Barol Brok (right side of the Sospor glacier), 15,300 feet, collected July 18, 1856.

11. *P. erosa*, Wall. Cat. 611; De Cand. p. 45.— Regel has given, in his 'Gartenflora,' vol. ii. pl. 51, a very good representation of this plant; and in the note to his description he shows that Duby is wrong in uniting this species with *P. denticulata*, Sm.—N. 920, Tibet, province of Ladak, locality left shore of the Indus near Le, 10,700 feet, collected July 5–10, 1856.

1. *Androsace globifera*, Duby, De Cand. p. 48.—N. 9316, Western Himalaya, province of Garhval, locality Gaurikund *viâ* Trijugi Narain and Maseo Tal to Bhillung, 6417–7570 feet, collected September 24 to October 3, 1855; n. 9636, n. 9650, n. 9651, n. 9682, province of Kamaon, locality environs of Milum (chief place of the district Johar), 11,200–12,100 feet, collected June 6–25, 1855.

2. *A. sarmentosa*, Wall. Fl. Ind. ii. pp. 14 and 15.—N. 3817, Western Himalaya, province of Kishtvar, locality Triloknath to the Kali Pass (south-west of Triloknath), collected June 24–27, 1856; n. 3963, province of Lahol, locality Rotang Pass to Koksar (northern slopes of the Pass), 13,061–10,344 feet, collected June 9, 1856; n. 9643, province of Kamaon, locality environs of Milum, 11,200–12,100 feet, collected June 6–25, 1855; n. 9744, locality Bagesar to Munshari *viâ* Kathi and Namik, 5000–7800 feet, collected May 24–31, 1855; n. 9983, province of Garhval, locality Badrinath, 10,000–10,600 feet, collected August 1–31, 1855.

3. *A. lanuginosa*, Wall. Fl. Ind. p. 15.—N. 4091, Western Himalaya, province Simla, locality environs of Simla, 6000–7300 feet, collected May 1–20, 1856; n. 6807, Tibet, province of Spiti, locality environs of the Salt Lake Tsomoriri, collected June 21–22, 1856; n. 6958, northern foot of Tari Pass *viâ* Mud to the southern foot of Parang Pass, 12,320–16,000 feet, collected June 12–17, 1856.

A. sarmentosa, Wall., and *A. lanuginosa*, Wall., are so different that I do not understand why Duby and other authors can unite them. The leaves of *A. sarmentosa*, Wall., are smaller and less in number, the umbels are tender and few-flowered, and the whole plant is less hairy than *A. lanuginosa*, Wall.; in fact, a single glance is sufficient to distinguish these two plants.

4. *A. Jacquemontii*, Duby; De Cand. p. 50. n. 24, and Duby, Mém. sur la Famille des Primulacées, t. 3. f. 1.—N. 5164, Western Himalaya, province of Kashmir, locality Kishtvar Pass to Islamabad, 5900 feet, collected August 5–10, 1856; n. 5343, Tibet, province of Ladak, locality Kharbu Koma to Shaksi (south-west of Da), 10,500 feet, collected July 3, 1856; n. 6520, locality Timti-la Pass *viâ* Δ Timti-Do to Kharbu Koma, 11,500–15,548 feet, collected July 2–3, 1856.

5. *A. Chamæjasme*, Willd. Sp. i. p. 799; De Cand. l. c. p. 51; Reich. Pl. Crit. vi. t. 580.—N. 12,116, Western Himalaya, province of Kulu, locality top of Rotang Pass (Pass between Kulu and Lahol), 13,061 feet, collected June 9, 1856.

6. *A. cordifolia*, Wall. in Plant. Asiat. Ras. t. 13. p. 371; Fl. Ind. ii. p. 17; De Cand. p. 54.—N. 2821, Western Himalaya, province Lahol, locality Kardong to Darche in the Bhaga valley, 10,200–11,750 feet, collected June 15–18, 1856; n. 3685, Kardong up to the limits of trees (slopes on the left side of the Bhaga river), 10,200–11,800 feet, collected June 13, 1856; left shore of the Bhaga (later Chinab) at Kardong, 10,200 feet, collected June 14, 1856; n. 4191, Koksar to Kardong, 10,200–10,350 feet, collected June 11 and 12, 1856, province of Kashmir, locality Tsoji Pass down to Δ Baltal (south-western slopes of the Pass), 7376–10,000 feet, collected October 14, 1856.

7. *A. incisa*, Wall. Fl. Ind. ii. p. 16; De Cand. p. 54.—N. 9821, Western Himalaya, province of Kamaon, locality Bageser to Munshari *viâ* Kathi and Nomik, 5000–7800 feet, collected May 24–31, 1855.

8. *A. elegans*, Duby; De Cand. l. c. p. 55.—N. 3099, Western Himalaya, province of Jamu, locality Padri Pass to Bhadrar, collected July 17–22, 1856; n. 3246, province of Chamba, locality Kali Pass to Chamba (the Kali Pass is north-east of Chamba), 10,500 feet, collected June 28 to July 8, 1856; n. 13,399, locality Simla *viâ* Kangra and Jamu to Kashmir, 3000–9000 feet, collected June to September, 1856.

1. *Cortusa Matthioli*, Linn. Sp. 206.—N. 4042, Western Himalaya, province of Lahol, locality left shore of the Bhaga (later Chinab) at Kardong, 10,242 feet, collected June 14, 1856.

1. *Lysimachia multiflora*, Wall. Flora Ind. p. 14; F. W. Klatt, Die Gattung Lysimachia,* t. 4.—N. 13,525, Eastern India, province

* F. W. Klatt, Die Gattung Lysimachia; Abhandlungen des Naturwissenschaftl. Vereins in Hamburg, vol. iv., Abtheilung iv.

Assam, locality Mangeldai to the foot of the Bhutan Himalaya, in the eastern Tarai 100–300 feet, collected December 1, 1855.

2. *L. ramosa*, Wall. l. c. p. 31; F. W. Klatt, l. c. t. 17.—N. 12,350, Eastern Himalaya, province of Sikkim, locality environs of Darjiling, 6000 to 8000 feet, collected June and July, 1855.

1. *Anagallus arvensis*, Linn. (*A. cærulea*, Schreb.; *A. Indica*, Wall. Sw. Br. Fl. Gard. t. 132, non *A. latifolia*, L. Duby!)—N. 2739, North-Western India, province of Panjab, locality near Peshaur, 1280 feet, collected December 28,1856, to January 6,1857; n. 10,408, province of Panjab, locality near Peshaur, 1280 feet, collected Jan. 11–20, 1857; n. 10,509, locality Lahor, 839 feet, collected March 10–14,1857; n. 10,633, locality Shahpur to Lahor (Jech and Rechna Duabs), 800 to 600 feet, collected March 4–8, 1857; n. 10,677, locality Kohat to Kalabagh (on the western side of the Indus), 1715–790 feet, collected February 5–9,1857; n. 11,159, locality Musakhel (south of Kalabagh on the Indus) along the salt range *viâ* Varcha and Choia to Gujrat, 1000–2500 feet, collected February 17 to March 5, 1857; n. 11,955, locality Kalabagh on the left side of the Indus, 790 feet, collected February 10–14, 1857; n. 12,906 and n. 12,913, Gangetic Delta, province of Bahar, locality in the dry bed of the river Gandak, near Patna, 170 feet, collected January 10–31, 1857; n. 4571, Western Himalaya, province of Kashmir, locality drained lake-basin of Kashmir, environs of Srinaggar within a circle of eight miles, 5000–5300 feet, collected October 2–20, 1856.

PITTOSPOREÆ.

1. *Pittosporum Rumphii*, Putterl. Synopsis Pittospor. p. 7.—N. 9301, Western Himalaya, province of Garhval, locality Gaurikunt *viâ* Trijugi Narain and Maser Tal to Bhillung, 6000–7000 feet, collected September 24 to October 3, 1855; n. 12,138, province of Rajauri, locality Uri across the Punch Pass *viâ* Kahuta to Punch, 5000–9000 feet, collected November 6–9, 1856.

IRIDEÆ.

1. *Gynandris Sisyrinchium*, F. W. Klatt, Revisio Iridearum, Linnæa, xxxiv. p. 577.—N. 10,283, North-western India, province of Punjab, locality from Kalabagh along the western side of the Indus *viâ* Lakki to Dera Ismael Khan, 790–478 feet, collected February 15–22,

1857 ; n. 11,391, locality Kohat (forty miles south of Peshuar), 1715 feet, collected January 1, 1857.

1. *Iris Kamaonensis*, Wall. ; Klatt, Revis. l. c. p. 594.—N. 7067, Thibet, province Gnari Khorsum, locality Δ Laptel to Δ Selchell and Δ Hati (south of the Satlej), 14,000–16,200 feet, collected July 16–19, 1825 ; n. 7337, locality northern foot of the Uta Dhura Pass across the Kiungar Pass to its northern foot, 16,200–17,600 feet, collected July 9–12, 1855 ; n. 9677, Western Himalaya, province of Kamaon, locality environs of Milum (chief place to the district Johar), 11,200–12,100 feet, collected June 6–25, 1855 ; n. 9788, locality Bageser to Munshari *viâ* Kathi and Namik, 5000–7800 feet, collected May 24–31, 1855 ; n. 9929, locality southern slopes of the Tari Pass, 15,000–12,000 feet, collected June 9, 1856.

2. *I. Nepalensis*, Wall. ; Klatt, Revis. Iridearum, p. 602. n. 19.—N. 4211, n. 4355, n. 4640, Western Himalaya, province of Kashmir, locality environs of Srinaggar, within a circle of eight miles) 5000–5300 feet, collected August 10 to September 30, 1856 ; n. 4665, n. 4925, n. 5022, province of Simla, locality environs of Simla, 6000–7300 feet, collected April 12–30, 1856 ; n. 12,035, province of Kashmir, locality Gures across the Ulli Plain and two small Passes to Bandipur (north-west of Srinaggar), 12,000–13,500 feet, collected October 5–12, 1856 ; n. 13,413, locality Simla *viâ* Kangra and Jamu to Kashmir, 3000–9000 feet, collected June to September, 1856 ; n. 6964, Tibet, province of Spiti, locality northern foot of Tari Pass *viâ* Mud to southern foot of Parang Pass, 12,320–16,000 feet, collected June 12–17, 1856.

3. *I. sulcata*, Wall. Cat. n. 5049.—N. 10,003, Western Himalaya, province of Garhval, locality Badrinath, 10,000–10,600 feet, collected August 1–31, 1855 ; n. 12,325 and n. 12,389, n. 12,634, Eastern Himalaya, province of Sikkim, locality environs of Darjiling, 6000–8000 feet, collected June and July, 1855.

4. *I. fragrans*, Lindley, l. c. ; Klatt, l. c. p. 614.—N. 4212 and n. 4564, Western Himalaya, province of Kashmir, locality environs of Srinaggar, 5000–5300 feet, collected August 10 to September 30, 1856, and October 2–20, 1856 ; n. 12,936, locality Gures across the Ulli Plain and two small Passes to Bandipur (north-west of Srinaggar), 12,300–16,500 feet, collected October 5–12, 1856 ; n. 11,692, province Chamba, locality environs of Nurpur, 4000–5500 feet, collected July 16–20, 1856 ; n. 5835, Tibet, province of Balti, locality

Kunes (on the right side of the Shayok) *viâ* Kiris to Neru (on the right side of the Indus), about 9000 feet, collected August 2–12, 1856; n. 6128, n. 6137, locality Poen, on the left side of the Shayok (opposite the Charbat), 8879 feet, collected July 10, 1856.

5. *I. longifolia*, Royle, Illustr. p. 372.—N. 12,595, Western Himalaya, province Rajauri, locality Punch *viâ* Kotli to Islamabad, 4000–2000 feet, collected November 10–15, 1856; n. 13,337, locality Simla *viâ* Kangra and Jamu to Kashmir, 3000–9000 feet, collected June to September, 1856; n. 13,008, Central Himalaya, province of Nepal, locality environs of Kathmandu, 5000–7000 feet, collected March 4 8, 1857; Gangetic Delta, province Bahar, locality in the dry bed of the river Gandak, near Patna, 170 feet, collected January 10–31, 1857.

6. *I. fimbriata,* Vent. Klatt, Revis. Iridearum, p. 619, n. 48.—N. 12,314 Eastern Himalaya, province of Sikkim, locality environs of Darjiling, 6000–8000 feet, collected June and July, 1855.

1. *Crocus sativus*, L.; Klatt, l. c. p. 675, var. *Cashmirianus*, Royle. —N. 4558, Western Himalaya, province of Kashmir, locality environs of Srinaggar, 5000–5300 feet, collected October 2–20, 1856.

Explanation of Plate LXXVIII., representing *Primula Telemachica*, Klatt. Figs. 1 and 2. Leaves. 3. Glands of leaf-margin. 4. Flower-head. 5. Involucrum. 6. Flower. 7. Corolla. 8. Corolla laid open. 9. Calyx segments. 10. Plate of corolla. 11. Anthers. 12. Pistil:—*all magnified.*

CORRESPONDENCE.

Viola arenaria.

When a plant is recorded as British from only one locality, the discovery of it in another is worthy of record; with this impression, I state that *Viola arenaria* was found in abundance among the grass on the top of the limestone mountain rising from the Warcop Station on the Eden Valley Railway, from the middle to the end of May, 1866, by James Backhouse, jun., and Alfred Wheeler. It was absent further south, where the elevation was less. As only its earlier flowers have petals, it is easiest to find in its spring-blooming. Though described by Babington as having large flowers, this is only relatively to the smallness of the plant, they are scarcely so large as those of *V. sylvatica*. This locality is several miles from the one on the sugar limestone of Teesdale, near Cauldron Snout, the upper great waterfall of the Tees. (See 'Journal of Botany,' Vol. I. p. 32.

James Backhouse.

Holgate House, York, March 6, 1868.

Asplenium adulterinum.

During the course of last winter the geographical distribution of a very curious plant has been more accurately ascertained,—I mean *Asplenium adulterinum* (intermediate between *A. Trichomanes* and *A. viride*), which grows on serpentine rocks in Bohemia, Moravia, and Saxony. I have examined it carefully and anatomically, and it is likely that the plant will play an important part when the question of the mutability of species is considered. As there are serpentine rocks in Great Britain, and the constant associate of *A. adulterinum* (viz. *A. serpentini*) occurs there,—for instance, between Aberdeen and Banff, in Scotland (see T. Moore in 'Journal of Botany,' 1863, p. 184; and 1864, p. 129, t. 17),—there is reason to believe that *A. adulterinum* may also be a member of the British flora.

J. Milde.

Breslau, March 14th, 1868.

BOTANICAL NEWS.

We regret to announce the death of W. E. G. Seemann, Esq., Member of the Imperial German Academy Naturæ Curiosorum, and for ten years associated with his brother Berthold in the editorship of the 'Bonplandia.' His death took place on the 3rd of March, and the great respect in which he was held by his townsmen was shown by several hundreds attending his funeral.

'The Journal of Travel and Natural History,' edited by Mr. Andrew Murray, F.L.S., and published by Messrs. Williams and Norgate, is the title of the new periodical already alluded to by us, of which the first number was issued in February, containing the following articles:—"The Geological Origin of the Present Scenery of Scotland," by Archibald Geikie, illustrated by woodcuts; "The Pedras Negras in Angola," by Dr. Welwitsch, illustrated by woodcuts; "Professor Agassiz in Brazil," reviewed by S. Scudder; "Dufton's 'Abyssinia;' "Hooker and Bentham's 'Genera Plantarum,'" reviewed by Prof. De Candolle; "Straits of Magellan," Letters from Dr. Cunninghame and Capt. Mayne.

The Indian Office has published 'The Chinchona Species of New Granada, containing the botanical descriptions of the species examined by Drs. Mutis and Karsten; with some account of those botanists, and their labours,' by Clements R. Markham, F.L.S., and with Notes by Mr. J. E. Howard.

Mr. Thomas Meehan, the editor of one of the most ably-conducted horticultural journals of America, has communicated to the Philadelphia Academy some interesting notes on "Diœcious Forms of *Vitis vinifera*, and the occurrence of *Pinus pungens* near Philadelphia," which we may be tempted to reprint.

Mr. W. O. Focke has printed in the Transactions of the Natural History Society of Bremen contributions to our knowledge of German Brambles, in which he says that his views on the genus *Rubus* are by no means definitely settled, but as yet undergoing constant development.

Dr. E. Fenzl sends us his sketch of the life and labours of the late Dr. Theodor Kotschy, from which we learn with pleasure that the merits of that great botanical traveller and explorer are at last put in their proper light by so competent a hand. Dr. Kotschy was born on the 15th of April, 1813, at Ostrau, in Austria, and died at Vienna on the 11th of June, 1866.

Our obituary this month includes the name of Mr. E. Tucker, of Margate, who first discovered the *Oidium Tuckeri*.

W Klatt del. Fitch. lith

Vincent Brooks, Imp.

W. Fitch, del. et lith.

Vincent Brooks, Imp

REVISION OF THE NATURAL ORDER HEDERACEÆ.

BY BERTHOLD SEEMANN, PH.D., F.L.S.

(*Continued from Vol. V. p.* 286.)

ON THE GENUS KISSODENDRON.

(PLATE LXXIX.)

The genus *Hedera*, as circumscribed by me, is very natural, and easily distinguished from all other *Hederaceæ* by its climbing and rooting branches, simple leaves, inarticulate pedicels, five petals and stamens, semi-inferior ovary, single style, and ruminate albumen. Dr. F. Mueller referred to it an Australian species, which has, however, articulate pedicels, a completely inferior ovary and compound leaves, and is held by me to be the type of the genus *Kissodendron*. This genus resembles *Pentapanax*, Seem. (Journ. of Bot. Vol. II. p. 294), both having pinnated leaves and an arboreous habit, but they differ in the following points:—

Pentapanax. Petala æstivatione imbricata. Drupa exsucca. Albumen æquabile. India orient.

Kissodendron. Petala æstivatione valvata. Drupa baccata. Albumen ruminatum. Nov. Holl.

KISSODENDRON, Seem. Journ. of Bot. Vol. III. p. 201 in adnot. (*Irvingia*, F. Muell. Fragm. vol. v. p. 17).—Char. emend.: Pedicelli articulati, ecalyculati v. calyculo obscuro. Calycis limbus 5-dentatus. Petala 5, æstivatione valvata, in calyptram cohærentia et tali modo v. tarde apice resilientia. Stamina 5. Ovarium inferum, 3–5-loculare, loculis 1-ovulatis. Stylus 1, elongatus. Drupa baccata, 3–5-pyrena. Albumen ruminatum.—Arbor glabra Novæ Hollandiæ, inermis, foliis pinnatis plurijugis, foliolis integerrimis ovatis v. lanceolato-ovatis brevi-acuminatis, basi obtusa inæquilateris, pedunculis primariis elongatis, secundariis inferioribus oppositis, superioribus aliquot verticillatis, summis umbellatis, umbellulis 8–12-floris. Species unica:

1. *K. Australianum*, Seem. l. c.—*Hedera Australiana*, F. Muell. Fragm. vol. iv. p. 120. *Polyscias Australiana*, F. Muell. Coll. *Irvingia Australiana*, F. Muell. Fragm. vol. v. p. 17.—Rockingham Bay, E. Coast of Australia (Dallachy! comm. cl. F. Muell.).

EXPLANATION OF PLATE LXXIX., representing *Kissodendron Australianum*, from specimens kindly furnished by the Kew and Melbourne Herbaria. —Fig. 1. Flower bud. Fig. 2. Expanded flower and stamen. Fig. 3. Ovary.

Fig. 4. Ovary cut across. Figs. 5 and 6. Ripe fruit and seed. Fig. 7. Fruit cut across. Figs. 8 and 9. Different views of seed; all, with exception of Fig. 5, magnified.

On the Genus Dipanax.

Dipanax (gen. nov.), Seem. Pedicelli inarticulati. Flores ecalyculati. Calyx . . . Petala 5. Stamina 5; antheræ ovatæ. Ovarium semisuperum, 2-loculare, loculis 1-ovulatis. Stigmata 2, sessilia. Drupa exsucca, 2-locularis, 2-sperma. Albumen . . .—Arbuscula Hawaiensis, foliis imparipinnatis, junioribus inflorescentiisque furfuraceo-puberulis demum glabratis; foliolis brevissime petiolatis 13–15 coriaceis oblongis v. ovatis integerrimis basi cordatis, umbellis racemoso-paniculatis. Species unica:

1. *D. Manni*, Seem.—*Heptapleurum dipyrenum*, Mann in Proceedings of the American Academy, vol. vii. p. 168.—Lanai, Hawaiian Islands (Mann !).

The sessile stigmas and inarticulate pedicels distinguish this genus from all other known dicarpous *Hederaceæ*. The flowers are unknown, but on the young ovaries, kindly communicated to me by Mr. Mann, the impression made on them by the stamens before anthesis is clearly discernible; and from this it appears that there were 5 stamens and ovate acute anthers.

On the Genus Didymopanax.

Didymopanax, Dcne. et Planch. in Revue Horticole, 1854, p. 109. Linden et Planch. Araliac. p. 1.—Pedicelli inarticulati. Flores polygami (masc. et hermaph.), mono- et dioici. Calycis limbus repando-5-dentatus. Petala 5, crassiuscula, libera, æstivatione valvata. Stamina 5, petalis breviora; antheræ ovatæ, mucronulatæ. Discus explanatus, margine libero undulato. Ovarium 2-loculare, in fl. masc. effœtum. Styli 2, sæpius basi ima, nunc longiuscule concreti (divisuris intus 1-sulcis stigmatosis) apud fl. masc. imperfecti, in fructu maturo persistentes, indurati, recurvi. Bacca drupacea, 2-pyrena, transverse elliptica, didyma, v. orbiculato-ovata; pyrenis a latere valde compressis, margine externo (v. dorso) leviter bicarinatis, latere utroque costis tenuibus nerviformibus arcuatis notatis, putamine crustaceo, læviusculo v. rugoso. Semina in loculis 1, lævia v. rugosa, integumento tenui. Albumen æquabile.—Arbores v. frutices Americæ tropicæ, sericeo- v. velutino-tomentosæ, nunc glabræ; foliis simplicibus v. sæpissime digitatim compositis, foliolis petiolulatis coriaceis integer-

rimis circa tuberculum v. apiculum centralem quasi verticillatis; stipulis parvis, petiolo adnatis; umbellis in paniculas amplas terminales dispositis; floribus viridiusculis.—Benth. et Hooker Gen. Plant. p. 939.

* *Folia simplicia.*

1. *D. lucumoides*, Dcne. et Planch. Rev. Hort. 1854, p. 109 (sine descript.). *Dendropanax tomentosum*, Seem. Journ. of Bot. 1864, p. 302; Revision Heder. p. 28!—Minas Geraes, Brazil (Claussen! 1843, n. 88; 1841, n. 4; et Coll. 1840. Dupré! Gardner! n. 4703).

** *Folia digitatim composita.*

2. *D. speciosum*, Dcne. et Planch. l. c.—*Panax speciosum*, Willd. Sp. iv. p. 1126. *P. undulatum*, H. B. K. Nov. Gen. et Sp. iv. p. 11. t. 417. f. 2, icon. fr.—Venezuela (Bonpland! in Herb. Paris.).

3. *D. Morototoni*, Dcne. et Planch. l. c.—*Panax Morototoni*, Aubl. Guian. ii. p. 949. t. 360. *P. undulatum*, Pers. Ench. p. 298, non Kunth?—Guiana (Aublet! in Mus. Brit., Perrottet!), Brazil (Guillemin! Burchell! n. 1842 et n. 4896; Moricand, n. 2345), Rio Negro and Casiquiare (Spruce! n. 1683 et n. 3456), Cuba (Wright! n. 211), Panama (Seemann! n. 1615, Sutton Hayes!), Dutch Guiana (Anderson! in Mus. Brit.), Trinidad (Crüger!), Tovar, Venezuela (Fendler! n. 2337), Popayan, N. Granada (Triana! Schlim et Funk!).

This is probably not distinct from *D. speciosum*. The leaflets are either attenuate at the base or rounded, and the tomentous covering underneath the blade varies in colour, being either of a brown or more or less silvery hue. The leaves of young plants are quite membranaceous, ciliate dentate, and pilose.

4. *D. chrysophyllum*, Dcne. et Planch. l. c.—*Panax chrysophyllum*, Vahl, Eclog. i. p. 33. *P. undulatum*, Pers. Ench. p. 298, non Kunth? —Porto Rico (Herb. Paris.!).

5. *D. marginatum*, Dcne. et Planch. l. c.—Minas Geraes, Brazil (Claussen! 1838, n. 39).

6. *D. parviflorum*, Dcne. et Planch. l. c.—*Panax parviflorum*, Mart. et Zucc. in Abh. d. Math. Phys. Cl. d. Baier. Akad. i. 319; Walp. Rep. ii. p. 429.—Minas Geraes, Brazil (Gardner! n. 4705, in Herb. Mus. Br. et Paris).

7. *D. calvum*, Dcne. et Planch. l. c.—*Panax calvum*, Cham. in Linnæa, viii. p. 232; Walp. Rep. ii. p. 422.—Brazil (Burchell! n. 2690; Spruce! n. 2811).

8. *D. sericeum*, Dcne. et Planch. l. c.—*Panax sericeum*, Pohl in De Cand. Prodr. iv. 254. *P. vinosum*, Cham. et Schlecht. in Linnæa, i. p. 403.—Brazil (Pohl! Langsdorff! Gardner! n. 4709, n. 8880; Burchell!).

9. *D. Pœppigii*, Dcne. et Planch. l. c.—*Panax chrysophyllum*, Pœpp., non Vahl.—Mayna Alto, Peru (Pœppig! n. 1959).

10. *D. argyrophyllum*, Dcne. et Planch. l. c.

11. *D. splendens*, Dcne. et Planch. ex Planch. et Linden, Araliac. p. 3.—*Panax splendens*, H. B. K. Nov. Gen. v. p. 11; De Cand. Prodr. iv. p. 253. n. 15. *Aralia (?) micans*, Willd. mss. ex Schult. Syst. vi. p. 101; De Cand. Prodr. iv. p. 258. n. 11.—Popayan (Bonpland! in Herb. Paris.).

12. *D. Spruceanum*, Seem.—*Hedera Spruceana*, Benth. mss.—Near Panure (Spruce!, n. 2307, in Herb. Paris. et Mus. Brit.).

13. *D. Claussenianum*, Dcne. et Planch. in Herb. Paris.—Minas Geraes, Brazil (Claussen! Coll. ann. 1841, n. 1495, and Coll. ann. 1838, n. 40).

14. *D. calcophyllum*, Dcne. et Planch. in Herb. Paris.—Bahia, Brazil (Blanchet! n. 2345).—Looks like *D. Morototoni*. Is it different?

15. *D. glabratum*, Dcne. et Planch. ex Linden et Planch. Araliac. p. 3.—*Panax glabratum*, H. B. K. Nov. Gen. v. p. 10; De Cand. Prodr. iv. p. 253. *P. attenuatum*, Swartz, Prodr. 54; Fl. Ind. Occ. ii. p. 562; Griseb. West Ind. Fl. p. 306. *P. Caribbæum*, Sieb. Fl. Martin. n. 290.—Martinique (Plée! n. 771), Caracas, Tovar, and Galipan (Funk et Schlim! n. 91, n. 528, et n. 530), Guadaloupe (De Ponthieu!), St. Christopher (Fr. Mason!), St. Vincent (Guilding!) Trinidad (Herb. Kew.).

Ought to be called *D. attenuatum*, if these two are identical, as I hold them to be. Styles connate nearly to top. Petals calyptriform coherent.

16. *D. Gardneri*, Seem. (sp. n.); foliis digitato-5-natis, foliolis subrotundatis v. ovato-rotundatis acuminatis, basi obtusis, margine integerrimis revolutis, supra glabris, lucidis, subtus sericeo-tomentosis; umbellis in paniculas terminales sericeo-tomentosas dispositis.—Diamond District, Brazil (Gardner! n. 4708).—"A shrub, about four feet high," Gardner, mss.

17. *D. macrocarpum*, Seem.—*Panax macrocarpum*, Cham. et

Schlecht. in Linnæa, i. p. 404.—Minas Geraes, Brazil (Sellow! Claussen! Coll. ann. 1840; Gardner! n. 4759, n. 4706, n. 4707; Burchell! n. 5144).

18. *D. Burchelli*, Seem. mss. in Herb. Hook.; foliis digitatim 7-natis, foliolis obovato-oblongis apice subbilobis, basi attenuatis, utrinque glaberrimis.—Porto Real, Brazil (Burchell! n. 8425).

Sciadophyllum rubiginosum, Pl. et Lind. Aral. p. 24, Venezuela (Funk et Schlim, n. 1528), is probably a species of *Didymopanax*.

On the Genus Aralia.

Aralia, Linn. Gen. n. 386, excl. sp.; Benth. et Hook. Gen. i. p. 936. —Pedicelli articulati. Flores sæpe polygamo-monoici. Calycis margo prominulus, truncatus, repandus v. brevissime 5-dentatus. Petala 5, ovata, obtusa v. brevissime inflexo-acuminata, marginibus plus minus imbricatis. Stamina 5; antheræ oblongæ v. rarius ovatæ, rectæ. Discus subplanus v. rarius conicus, margine libero. Ovarium 3–5-loculare; styli nunc basi erecti v. breviter connati, superne demum recurvi, nunc a basi recurvi v. summo apice inflexi; stigmata terminalia. Fructus 3–5-angulatus, exocarpio carnoso; pyrenæ 3–5 orbiculatæ, ovatæ v. oblongæ, compressæ, crustaceæ v. duræ. Semen compressum, albumine æquabili.—Herbæ perennes v. frutices, glabri pubescentes setosi v. aculeati. Folia alterna, digitata pinnata v. ternato-pinnatim pinnatimve decomposita, foliolis serrulatis. Stipulæ a basi petioli parum prominentes. Umbellulæ solitariæ racemosæ paniculatæ v. terminales, rarius in umbellam compositam dispositæ. Bractæ parvæ.—*Dimorphanthus*, Miq. Com. Phytogr. 95. t. 12.

This genus is here restricted to the pentecarpous, by abortion tricarpous, species; the truly dicarpous ones, having a distinct habit, are referred by me to *Panax*.

Species Chinenses:—

1. *A. Chinensis*, Linn. Sp. 393; De Cand. Prod. vol. iv. p. 259, excl. syn. Blume; Hance in Seem. Journ. of Bot. 1866, p. 172.—*Leea spinosa*, Spreng.—China (Lord Macartney! in Herb. Mus.).

2. *A. Planchoniana*, Hance in Seem. Journ. of Bot. 1866, p. 172. —Ilha Verde, near Macao, S. China (Hance).

3. *A. Decaisneana*, Hance in Seem. Journ. of Bot. 1866, p. 172. —Island of Formosa.

4. *A. Mandschurica*, Seem.—*Dimorphanthus Manchuricus*, Rupr. et Maximow. Fl. Amer. p. 133.—On the Lower Amur (Maximowicz! in Herb. Hook.).

Species Japonicæ:—

5. *A. elata*, Seem.—*Dimorphanthus elatus*, Miq. Com. Phytogr. 95. t. 12; Walp. Rep. vol. ii. p. 430.—*Aralia grandis*, Miq. Herb. Japan.

6. *A. canescens*, Sieb. et Zucc. Abhand. Math. Phys. Kl. Bayr. Akad. vol. ii. p. 222; Walp. Ann. vol. i. p. 982.—Japan (Bürger! Oldham!).

7. *A. edulis*, Sieb. et Zucc. Fl. Jap. i. 57. t. 25.—*Dimorphanthus edulis*, Miq. Com. Phytogr. p. 96; Walp. Rep. ii. p. 431. *Aralia cordata*, Thunb. Fl. Jap. p. 127? *A. racemosa*, var. *Sachalinensis*, Regel, Gartenflora, 1864, t. 432?—Japan.

Species Indicæ:

8. *A. Cachemirica*, Dcne. in Jacquem. Voy. iv. p. 72. t. 82; Walp. Rep. ii. p. 430.—*A. macrophylla*, Lindl. Bot. Reg. (New Series) xvii., Plant. Misc. p. 73. n. 72. *Panax tripinnatum*, Wall. Cat. n. 4934. *P. decompositum*, Wall. Cat. n. 4935; De Cand. Prod. iv. p. 255.—Nepal (Wallich! Cat. n. 4934 et 4935).

9. *A. foliolosa*, Seem.—*Panax (?) foliolosum*, Wall. Cat. n. 4928. —Sikhim (Hooker f. et Thomson!); Bootan (Griffith! n. 2074 in Mus. Brit.); Silhet (Wallich! n. 2928).

10. *A. Thomsonii*, Seem. (n. sp.).—Khasia mountains (Hook. f. et Thomson! *Araliaceæ*, n. 42); Assam Plains (Jenkins!).

11. *A. armata*, Seem.—*Panax armatum*, Wall. Cat. n. 49, 33; G. Don, Gen. Syst. iii. p. 386; Walp. Rep. ii. p. 429.—Tavoy (Wallich! n. 49, 37); Khasia and Sikhim (Hook. f. et Thomson!).

12. *A. Finlaysoniana*, Seem.—*Panax Finlaysonianum*, Wall. Cat. n. 49, 36; G. Don, Gen. Syst. iii. p. 429; Walp. Rep. ii. p. 492.—India (Wallich! n. 4937.).

13. *A. cissifolia*, Griffith, mss. in Herb. Hook.—*Panax scandens*, Edgw. mss. in Herb. Hook.—Bootan (Griffith!), Kumaon (Strachey and Winterbottom!).

Has the habit of *Eleutherococcus*. Leaves 5-nately digitate.

Species Boreali-Americæ:

14. *A. nudicaulis*, Linn. Sp. p. 393, non Blum.; Raf. Med. Bot. i.

t. 8; Torr. et Gray, Fl. North Amer. i. p. 646. Nomen vernac. "Wild Sarsaparilla."—Canada to the mountainous portions of the Southern United States (Nuttall! Douglas! Anderson! Kertland! in Herb. Mus. Brit.).

15. *A. racemosa*, Linn. Sp. p. 393; Schk. Hand. t. 86; Torr. et Gray, Fl. North Amer. i. p. 646. Nomen vernac. "Spikenard."—Canada to mountains of Georgia and Rocky Mountains (Nuttall! Kertland!)

16. *A. hispida*, Michx. Fl. Am. Sept. i. p. 185; Vent. Hort. Cels. t. 41; Sims, Bot. Mag. t. 1041; Lodd. Bot. Cat. t. 1306; Torr. et Gray, Fl. North Amer. i. p. 647.—*A. Muhlenbergiana*, Schult. Syst. vi. p. 704. Nomin. vernac. "Wild Elder" et "Bristly Sarsaparilla."—Lakes Winipeg and Superior (Richardson!); Sachakawan (Richardson!); Nova Scotia (Alex. Anderson!); Massachusetts (Nuttall!).

17. *A. humilis*, Cav. Icon. iv. p. 7. t. 313.—Mexico.

18. *A. pubescens*, De Cand. Hort. Monsp. 1813, p. 80; Prod. iv. p. 258.—Mexico.

19. *A. spinosa*, Linn. Sp. p. 392.—*A. spinosa*, var. γ, Torr. et Gray, Fl. North Amer. i. p. 647. Nomin. vernac. "Prickly Ash," "Angelica Tree," "Hercules Club."—United States (Nuttall! Pursh! Gouan! Drummond! Short!)

20. *A. Leroana*, C. Koch, Wochenschrift, 1864, p. 369.—*A. spinosa*, var. β, Torr. et Gray, Fl. North Amer. i. p. 647. *A. Japonica*, Hort. Germ. non Auct.—North America.

Professor K. Koch, l. c., thus distinguishes *A. spinosa* and *A. Leroana*.

A. spinosa; spinosissima; petioli glabri; foliola oblongo-lanceolata, cuspidata, glabra, subtus glaucescentia; panicula pedunculata, elongata, rami alterni, denuo ramosi, ramulis plerumque ad apicem solum umbelliferis; flores majores.

A. Leroana; spinosa; petioli puberuli; foliola supra aspera aut denique glabriuscula, acuta aut acuminata, subtus pubescentia glaucescentia; panicula sessilis, contracta, ramis elongatis denuo ramosis, ramulis ubique umbelliferis; flores minores.

Species Javanicæ et Philippinenses:

21. *A. Javanica*, Miq. in Bonplandia, 1859, p. 137.—*Aralia Chinensis*, Blume, Bijdr. p. 870, non Linn.—Java (Horsfield! in Mus. Brit.; Junghuhn! in Herb. Hook.)

22. *A. hypoleuca*, Presl, Epim. p. 250; Walp. Ann. ii. p. 724.—Philippine Islands (Cuming! n. 920 et 792 in Mus. Brit.)

23. *A. montana*, Blume, Bijdr. 870; Miq. Fl. Ned. Ind. l. c. p. 750.—*Aralia bipinnata*, Reinw. Herb.—Java (Horsfield! in Mus. Brit.).

24. *A. dasyphylla*, Miq. in Bonplandia, 1856, p. 138; Fl. Ned. Ind. l. c. p. 751.—Java (Junghuhn!)

25. *A. ferox*, Miq. in Bonplandia, 1856, p. 137; Fl. Ned. Ind. l. c. p. 750.—Java.

Species exclusæ.

A. Abyssinica, Hochst.=*Sciadophyllum Abyssinicum*, Steud.
A. acerifolia, Willd.=*Oreopanax acerifolium*, Seem.
A. aculeata, Ham.=*Brassaiopsis aculeata*, Seem.
A. acutifolia, Willd.=(?) *Dendropanax*.
A. angularis, Willd.=*Oreopanax angulare*, Seem.
A. arborea, Linn.=*Dendropanax arboreum*, Dcne. et Planch.
A. arborea, Arrab.=*Gilibertia Brasiliensis*, Seem.
A. argentata, H. B.=*Oreopanax argentatum*, Dcne. et Planch.
A. aromatica, Blume=*Agalma aromaticum*, Seem.
A. avicenniæfolia, H. B.=*Oreopanax avicenniæfolium*, Dcne. et Pl.
A. calyculata, Zoll. et Mor.=*Macropanax oreophilum*, Miq.
A. capitata, Jacq.=*Oreopanax capitatum*, Dcne. et Planch.
A. capitulata, Jungh. et Vries.=(?) *Osmoxylon*.
A. catalpæfolia, Willd.=*Oreopanax catalpæfolium*, Dcne. et Planch.
A. cheirophylla, Spr.=*Oreopanax cheirophyllum*, Dcne. et Planch.
A. Chinensis, Lour.=(Rumph. Amb. iv. 44.)
A. cochleata, Lam.=*Nothopanax cochleatum*, Miq.
A. crassifolia, Sol.=*Pseudopanax crassifolium*, C. Koch.
A. crassinervia, H. B.=*Oreopanax crassinervium*, Dcne. et Planch.
A. Cumanensis, H. B.=*Oreopanax Cumanense*, Dcne. et Planch.
A. digitata, Willd.=*Oreopanax Xalapense*, Dcne. et Planch.
A. digitata, Roxb.=*Heptapleurum venulosum*, Seem.
A. discolor, H. B.=*Oreopanax discolor*, Dcne. et Planch.
A. disperma, Blume=*Macropanax oreophilum*, Miq.
A. dubia, Spr.=*Trevesia palmata*, Vis.
A. Echinops, Cham.=*Oreopanax Echinops*, Dcne. et Planch.
A. erinacea, Hook.=*Horsfieldia horrida*, Seem.
A. farinosa, Delile=*Nothopanax farinosum*, Seem.
A. ferruginea, H. B.=*Sciadophyllum ferrugineum*, Dcne. et Planch.

A. ferruginea, Linden=*Oreopanax Humboldtianum*, Dcne. et Planch.

A. floribunda, H. B.=*Oreopanax floribundum*, Dcne. et Planch.

A. fragrans, Don (Steud. !)=*Heteropanax fragrans*, Seem. et *Pentapanax Leschenaultii*, Seem.

A. heptaphylla, Willd.=*Sciadophyllum ferrugineum*, Dcne. et Planch.

A. heterophylla, Mutis=*Oreopanax Mutisianum*, Dcne et Planch.

A. heterophylla, Willd.=*Oreopanax acerifolium*, Seem.

A. Humboldtiana, Rœm. et Schult.=*Oreopanax floribundum*, Dcne. et Planch.

A. Japonica, Thunb.=*Fatsia Japonica*, Dcne. et Planch.

A. jatrophæfolia, H. B.=*Oreopanax jatrophæfolium*, Dcne. et Planch.

A. incisa, Willd.=*Oreopanax floribundum*, Dcne. et Planch.

A. Kleinii, Steud.=*Miquelia Kleinii*, Meisn.

A. lætevirens, Gay=*Cheirodendron lætevirens*, Seem.

A. lappæfolia, Ræusch=? .—Planta Indica Or.

A. Lessoni, Hook.=*Pseudopanax Lessoni*, C. Koch.

A. longifolia, Reinw.=*Brassaia littorea*, Seem.

A. lucescens, Blume=*Agalma lucescens*, Seem.

A. macrophylla, A. Cunn.=*Meryta latifolia*, Seem.

A. Maralia, R. et Sch.=*Maralia Madagascariensis*, De Cand.

A. micans, Willd.=*Didymopanax splendens*, Dcne. et Planch.

A. Mitsde, Sieb. et Zucc.=*Dendropanax Japonicum*, Seem.

A. monogyna, Arrab.=*Dendropanax monogynum*, Seem.

A. Moorei, F. Muell.=*Heptapleurum venulosum*, Seem.

A. multiflora, Pohl=*Oreopanax capitatum*, Dcne. et Planch.

A. Mutisiana, H. B.=*Oreopanax Mutisianum*, Dcne. et Planch.

A. nodosa, Blume.=*Polyscias nodosa*, Seem.

A. obtusiloba, H. B.=*Oreopanax obtusilobum*, Dcne. et Planch.

A. octophylla, Lour.=*Agalma octophyllum*, Seem.

A. palmata, Lam.=*Trevesia Moluccana*, Miq.

A. palmata, Reinw.=*Trevesia Sundaica*, Miq.

A. palmata, Willd.=*Oreopanax cheirophyllum*, Seem.

A. palmata, Lour.=*Brassaiopsis Hainla*, Seem.

A. paniculata, Philip.=*Cheirodendron Valdiviense*, Seem.

A. papyrifera, Hook.=*Tetrapanax papyriferum*, C. Koch.

A. pentaphylla, Thunb.=*Acanthopanax spinosum*, Miq.

A. pinnatifida, Jungh. et Vries.=*Aralidium pinnatifidum*, Miq.

A. pergamacea, Blume=*Heptapleurum pergamaceum*, Hassk.

A. pinnata, Hochst.=*Nothopanax farinosum*, Seem.
A. platanifolia, H. B.=*Oreopanax platanifolium*, Dcne. et Planch.
A. polaris, Hombr.=*Stilbocarpa polaris*, Dcne. et Planch.
A. Polyscias, Spr.=*Polyscias umbellata*, Forst.
A. polygama, Bks. et Sol.=*Schefflera digitata*, Forst.
A. Quinduensis, H. B.=*Sciadophyllum Quinduense*, DC.
A. quinquefolia, A Gray=*Panax quinquefolium*, Linn.
A. ramiflora, Pohl=*Dendropanax ramiflorum*, Seem.
A. Reinwardtiana, Steud.=*Trevesia Sundaica*, Miq.
A. reticulata, H. B.=*Oreopanax Humboldtianum*, Dcne. et Planch.
A. rigida, Blume=*Heptapleurum rigidum*, Seem.
A. rugosa, Blume=*Agalma rugosum*, Miq.
A. salicifolia, Vent.=?
A. scandens, Poir.=*Brassaiopsis Hainla*, Seem.
A. Schefflera, Spr.=*Schefflera digitata*, Forst.
A. Sciadophyllum, Sw.=*Sciadophyllum Brownei*, DC.
A. Sieboldii, Hort.= (?) *Fatsia Japonica*, Dcne. et Planch.
A. septemnervia, H. B.=*Oreopanax septemnervium*, Dcne. et Planch.
A. simillima, Blume=*Agalma simillimum*, Miq.
A. tarchonanthifolia, Willd.=*Oreopanax avicenniæfolium*, Dcne. et Planch.
A. trifolia, Bks.=*Pseudopanax crassifolium*, C. Koch.
A. trifolia, A Gray=*Panax trifolium*, Linn.
A. trifoliata, Meyen=*Acanthopanax aculeatum*, Seem.
A. trigyna, Gaud.=*Cheirodendron Gaudichaudii*, Seem.
A. triphylla, Poir.=*Panax trifolium*, Linn.
A. Turbacensis, H. B.=*Oreopanax Turbacense*, Dcne. et Planch.
A. umbellata, Pohl=*Dendropanax cuneatum*, Dcne. et Planch.
A. umbellata, Pav.=*Giliberta umbellata*, Ruiz et Pav.
A. umbellifera, Lam.=*Osmoxylon Amboinense*, Miq.
A. umbraculifera, Roxb.=*Polyscias nodosa*, Seem.
A. Valdiviense, Gay=*Cheirodendron Valdiviense*, Seem.
A. Vitiensis, A. Gray=*Schefflera Vitiensis*, Seem.
A. Xalapensis, H. B.=*Oreopanax Xalapense*, Dcne. et Planch.

On the Genus Stilbocarpa.

Stilbocarpa, Dcne. et Planch. Rev. Hort. 1854, p. 105.—Pedicelli articulati. Flores ecalyculati, polygami. Calycis tubus obovatus;

limbus truncatus. Petala 5, obovato-oblonga, obtusa, æstivatione imbricata. Stamina 5; antheræ oblongæ. Styli 3–4, divergentes, recurvi, omnino liberi. Stigmata punctiformia. Ovarium 3–4-loculare. Drupa depresso-sphærica, suberosa, 3–4-pyrena. Albumen æquabile. —Herba perennis, regionibus subantarcticis et Nova Zelandia inhabitans, inermis, tota setis mollibus laxis obsita, fœtida; foliis (maximis) stipulatis longe petiolatis orbiculari-reniformibus basi profunde cordatis marginibus multilobatis; umbellulis compositis; involucris foliaceis; floribus densis; drupis atris nitidis, grana piperis magnitudine. —Hook. f. Fl. N. Zeal. i. p. 95. *Araliæ* sp., Homb. et Jacq. Species unica:

1. *S. polaris*, Dcne. et Planch. l. c.; Hook. f. Fl. N. Zeal. i. p. 95; A. Gray, Bot. Wilkes, p. 716.—*Aralia polaris*, Homb. et Jacq. Voyage au Pôle Sud, t. 2, sine descript.; Hook. f. Fl. Ant. p. 19; Handbook, Fl. N. Zeal. i. p. 100. Hook. Icon. Plant. t. 744.—Geogr. Distr. Southern Island of New Zealand (Lyall!); Lord Auckland's Islands (J. D. Hooker! Dr. Holmes!); Campbell's Islands (J. D. Hooker!), covering large tracts.

This genus, on account of the quincuncial æstivation of its corolla, belongs to *Araliaceæ*.

On the Genus Triplasandra.

Triplasandra, Seem. (gen. nov.).—Pedicelli inarticulati. Flores ecalyculati, polygami. Calycis tubus obovatus; limbus truncato-repandus. Petala 5–6, triangulari-lanceolata, æstivatione valvata. Stamina duplo triplove petalorum numero, uniserialia; filamenta subulata; antheræ oblongæ. Ovarium 5–6-loculare, loculis 1-ovulatis. Stigmata 5–6, punctiforma, stylopodio brevi conico imposita. Drupa baccata, ovata-oblonga, 5–6-angulata. Albumen æquabile.—Arbor Hawaiiensis; foliis exstipulatis, pinnato-5–9-foliolatis, foliolis carnosis oblongis v. ovalibus obtusis integerrimis; umbellis compositis cymosis. Species unica:

1. *T. Oahuensis*, Seem.—*Gastonia (?) Oahuensis*, A. Gray, Bot. Wilkes, i. p. 726; Horace Mann, Enum. Hawaiian Plants, p. 169. Nomen vernac. Hawaiense, fide Mann, "Ohe mauka."—Hawaiian or Sandwich Islands (U. S. Expl. Expedition!; H. Mann!; Hillebrand!).

Asa Gray, not having fertile flowers when he first described this

plant, provisionally referred it to *Gastonia* with a mark of doubt. When revising *Gastonia* I excluded it from that genus, being convinced that it was the type of a new one; and the specimens just received from Mr. H. Mann, of Cambridge, Mass., collected in December, 1867, by Dr. Hillebrand, enabled me to publish the above character. It is closely related to *Tetraplasandra*.

Additions and Corrections to the Revision of Hederaceæ.

Gastonia, Comm., add:

Species exclusæ:—

G. (?) Oahuensis, A. Gray = *Triplasandra Oahuensis*, Seem. (gen. n.).

Grotefendia, Seem. = *Botryopanax*, Miq. in Ann. Mus. Lugd. Bat. i. p. 5.

G. paniculata, Seem., add: *Gastonia sausuroides*, (?) Rœper in Bot. Zeit. 1848, p. 257. t. 1. *Botryopanax Borbonicum*, Miq. l. c.

Bakeria, Seem. Stamens 15–23, in several rows, according to Bentham and Hooker.

Brassaiopsis, Dcne. et Planch. Albumen ruminate, not even.

B. Hainla, Seem., add: *Panax (?) Hainla*, De Cand. Prod. iv. p. 253.

Species exclusa:—

B. ricinifolia, Seem. = *Acanthopanax ricinifolium*, Seem.

Pentapanax, Seem. Petals imbricate, hence the genus must be removed to *Araliaceæ*.

Agalma, Miq., add:—

15. *A. Kavaiense*, Seem. (*Heptapleurum Kavaiense*, Mann in Proceed. Am. Acad. vii. p. 168).—Kauai, Hawaiian Islands (Mann!).

Dendropanax, Dcne. et Planch., add:—

15. *D. monogynum*, Seem. (*Aralia monogyna*, Arrab. Fl. Flum. ii. p. 17. t. 75). Umbels solitary, on long, erect peduncles. Allied to *D. nutans* and *Darienense*.—Brazil.

16. *D. cuneifolium*, Seem. (*Hedera cuneifolia*, Wright, Plant. Cub.).—Cuba (Wright! n. 2631).

17. *D. samydifolium*, Seem. (*Sciadophyllum samydifolium*, Wright, Plant. Cub.).—Cuba (Wright! n. 2632).

Species exclusa:—

D. tomentosum, Seem. = *Didymopanax lucumæfolium*, Dcne. et Planch.

Hedera, Linn., add:—

Species exclusæ:—

H. cuneifolia, Wright = *Dendropanax cuneifolium*, Seem.

H. quinquefolia, Arrab, = *Vitis Arrabidæa*, Seem. (*Cissus quinquefolia*, Soland.).

H. unifolia, Arrab. = *Vitis unifolia*, Seem.

Osmoxylon, Miq., add:—

2. *O. Cumingii*, Seem. (sp. n.).—Philippine Islands (Cuming! n. 754).

3. *O. Borneense*, Seem. (sp. n.).—Foliis digitato-11-foliolatis, foliolis lanceolato-linearibus serratis, stipulis fimbriato-laceris.—N. E. of Borneo (Thom. Lobb! in Herb. Kew.).

Aralia capitulata, Jungh. et de Vris., may be a fourth species of this genus.

Heptapleurum, Gærtn.:

H. venulosum, Seem.—Omit *Panax serratum*, Wall., as synonym.

Species exclusæ:—

H. dipyrenum, H. Mann = *Dipanax Manni*, Seem. (gen. n.).

H. Kavaiense, H. Mann = *Agalma Kavaiense*, Seem.

Gilibertia, Ruiz et Pav.:

G. Brasiliensis, Seem. = (?) *Aralia arborea*, Arrab. Fl. Flum. iii. t. 100.

Sciadophyllum, P. Browne.

Species exclusæ:—

S. racemiferum, Miq. = *Cheirodendron*.

S. samydifolium, Wright = *Dendropanax samydifolium*, Seem.

Pseudopanax, C. Koch:

Add to generic character: Foliis exstipulatis v. stipulatis.

P. crassifolium, C. Koch, add: *Panax crassifolium*, Dcne. et Planch. in Rev. Hort. 1854, p. 105.

3. *P. lineare*, Seem. (*Panax lineare*, Hook. f. Fl. N. Zeal. i. p. 93; ejusd. Handbook N. Z. Fl. p. 101).—Middle Island of New Zealand (Lyall!).

Oligoscias, Seem. = *Maralia*, Petit Thouars.

O. Madagascariensis, Seem. = *Maralia Madagascariensis*, De Cand.

Polyscias, Forst., add to generic character: Styli 5–12.

Oreopanax, Dcne. et Planch:

O. Humboldtianum, Dcne. et Planch., add: *O. (?) reticulatum*, Dcne. et Planch.—Nomen vernac. "Papayon."—Silla de Caracas (Bonpland! in Herb. Mus. Paris).

O. (?) Turbacense, Dcne. et Planch.—There are only three leaves of this in the Paris Herbarium, two of which are 3-lobed, the lobes ovate acuminate. *O. discolor* has similar foliage, but that of *O. Turbacense* is quite glabrous, and looks almost a form of *O. capitatum*.

Nothopanax, Miq.:

N. sambucifolium, C. Koch, add: *Panax dendroides*, F. Muell. in Hook. Journ. 1856, p. 72.

N. simplex, Seem.=*(?) Panax simplicifolium*, Dietr. Gart. Lexicon.

N. arborum, Seem., add: *Panax Australasia*, Pers. Euch. i. p. 298.

Cussonia, Thunb.:

C. (?) Bojeri, Seem.—Ovarium 1-loculare; hence probably the type of a new genus.

Raukana, Seem., read always *Raukaua*.

Trevesia, Vis.:

T. Sundaica, Miq.—Omit: Regel, Gart. 1364, t. 438, which plate seems to represent a different species.

T. palmata, Vis., add: *Aralia dubia*, Spreng. teste Steudel.

Panax, Linn.:

Species exclusæ:—

P. Australis, Rœm. et Schult. Syst. Veg. vi. pp. 215 et 380=*Hermas Australis*, Spreng. Prod. Umbell. p. 19.—New Holland.—A very doubtful plant, not taken up by Bentham (Fl. Austr.).

P. crenatum, Dietr. Gart. Lexicon, vi. p. 633=?

P. simplicifolium, Dietr. Gart. Lexicon=*(?) Nothopanax simplex*, Seem.

ON THE SCULPTURE OF THE TESTA OF GERMAN JUNCACEÆ.

By Dr. Francis Buchenau, of Bremen.

[Translated from the 'Botanische Zeitung,' vol. xxv. p. 201.]

To distinguish between the different species of *Juncus* and *Luzula* is not an easy matter, owing to the great similarity exhibited

in the structure of their flower and fruit; and though in the genus *Juncus* the larger groups are founded upon the nature of the vegetative organs and the inflorescence, and in the genus *Luzula* (where the leaves are generally very uniform) upon the shape of the appendicules of the seed and also the inflorescence, yet one is essentially dependent for further differential characters upon the structure of the flower, the form, colour, and size of the perianth, the number and structure of the anthers, and the form and comparative size of the pistil and the fruit. It is therefore important to be able to avail ourselves of a new character which is but little variable,—I mean the more delicate structure of the testa. True, the configuration of the seed has long ago been noted. Ernest Meyer founded upon the nature of the appendicules in *Luzula* his three groups of that genus; whilst in the genus *Juncus* attempts have been made to separate the species with caudate seeds (*seminibus scobiformibus*) from those with ecaudate; and Desvaux even founded upon the former his untenable genus *Marsippospermum*, but the more delicate structure was overlooked, and characters derived from it could therefore not be employed for the better definition of species. Yet these afford a number of good, and, as far as I know, constant marks of distinction.

My attention was first directed to these characters by examination of *Juncus sphærocarpus*, Nees ab Esenb. In my paper on the inflorescence of the *Juncaceæ* ('Jahrbücher der wissenschaftlichen Botanik,' iv. 1865) I passed this plant over in silence, as it was by almost all regarded as a variety of *J. Tenageja*, Ehrh. However, I could not rest satisfied with that; again and again I returned to its examination, and became convinced that it (at least the specimens at my disposal collected about Vienna) was much nearer *J. bufonius*, Linn., than *J. Tenageja*,—a conviction in which I am borne out by Ortmann's observations (Verhandl. zool.-bot. Vereins, 1854, ix. p. 12) which afterwards came to hand. On comparing the two species, the colour of the seeds arrested my attention. I first examined them with a lens, and, in order to trace out differences, afterwards placed them under higher magnifying power (seventy-five times), and reflected light. In this I was successful. Upon the surface of the seeds of both species a system of meshes with depressions between them, and of distinctive characters could be made out. In *J. Tenageja* the meshes form a *regular* network, whilst in *J. sphærocarpus* the meshes are narrow and

transverse; besides, the seeds of the former species are larger and more pointed than they are in the latter; and if the magnifying power be still more increased, the fields of the meshes of *J. sphærocarpus* are found to be smooth, and in *J. Tenageja* furnished with extremely small elevations, which may be owing either to very minute granules or to a system of extremely delicate sunken and netted lines. My attention being thus directed to this point, I examined a series of other seeds, and soon became convinced that the more delicate structure of the testa presented very important characters for diagnostic purposes. On learning from Professor Alexander Braun that Dr. Engelmann, of St. Louis, Mo., was working up the *Juncaceæ* of North America, I did not fail to draw his attention to this character, and was glad to find that in his 'Revision of the North American Species of *Juncus*,' published in the 'Transactions of the Academy of Science of St. Louis,' 1866, vol. ii. n. 2, it had been well attended to, and been raised to an important rank. In the following I shall therefore use as my basis Engelmann's paper, which enjoys priority of publication; but I thought it necessary to make the foregoing remarks, in order to show how it comes to pass that both of us have made, independently of each other, the same observations.

According to the surface of the seeds, Dr. Engelmann distinguishes three principal groups, which he defines as follows:—

1. Semina reticulata; vix s. distincte apiculata.
2. Semina transverse lineolata, levissime costata; vix s. distincte apiculata seu breviter caudita.
3. Semina costata, plus minus caudata.

"*Costæ*" he calls the more or less developed longitudinal lines. When these alone are prominent, and connected by few and obscure transverse lines, the seeds are naturally called "*semina costata*." In explanation of the other two terms I add Dr. Engelmann's own words: —"When the ribs are fewer, are wider apart, and united by transverse ridges, so to form somewhat rectangular meshes, I call the seeds '*semina reticulata*;'" and "a large number of *Junci* exhibit (in fully ripe seeds) a very delicate but regular transverse reticulation without very distinct ribs—'*semina lineolata*.'"

At first sight this classification seems to have much to recommend it, for it resolves itself into this:—

Seeds with longitudinal ribs only (or nearly so)—"*semina costata*."

Seeds with transverse ridges only (or nearly so) —"*semina lineolata.*"

Seeds with uniform, longitudinal and transverse lines—"*semina reticulata.*"

The terms "*semina costata*" and "*semina reticulata*" well express the nature of the organs, but those of "*semina lineolata*" seem less appropriate, and would only be correct if these connected, uninterrupted transverse lines surrounded the seeds (something like the hoops of a cask), and were not connected at all, or only slightly, by longitudinal lines. But this is not the case. True, if the seeds of any of the species under consideration (say *Juncus effusus*, or those even more delicately netted ones of *J. bufonius*) are placed under the microscope the transverse lines become conspicuous, but they do not surround the seeds; on the contrary, they are interrupted at some distance by another series of transverse lines, which mostly occupy the intermediate space between the others, and are united to them by longitudinal lines with forked points. The following may tend to give the best illustration of the formation :—

Imagine a system of regular hexagons,—something like the cells of a honeycomb somewhat stretched laterally. The two other parallel sides, which by this process have become elongated, would become rather prominent, forming a system of distinct parallel lines; the four other sides of the hexagon not enlarged would represent longitudinal lines terminating in forks, and connecting the points of the transverse lines.

This is the case with the seeds of *Juncus;* the planes of the hexagon are concave, their edges projecting beyond the cavity; and though the transverse edges are more prominent than the forked (or where more blunt), wavy, longitudinal lines, yet one is not justified in following Engelmann in classifying the seeds exclusively according to the transverse lines; at least, when first consulting Dr. Engelmann's otherwise excellent paper, I was led astray by this flaw, always seeing longitudinal lines where, from Engelmann's terms "*semina lineolata*" I did not expect to find any. However, it is self-evident that the longitudinal lines (*costæ*), if they are uninterrupted, are more prominent than they are, as in the case before us, when bent towards one side or other. The bending, however, is either an obscure waviness, or a more sudden crumpling. It does, therefore, seem to me more natural to classify the seeds which Engelmann terms "*semina lineolata*" with the "*semina reticulata*" (perhaps with the ex-

ception of the common North American *J. tenuis*, Willd., in which the longitudinal ribs are so subdued that they disappear altogether on maturity,* and which exhibit on the surface closed and sunken meshes) than to distinguish them as "*semina transverse reticulata*" from those in which the meshes are nearly of equal dimensions. We have the very appropriate term "*costæ*" for the longitudinal ribs or lines, but have to select another for the transverse lines, "*lineolæ*" being used by Engelmann, not only for the raised transverse lines forming the meshes, but also for those transverse lines which terminate within the meshes, so common in the *Junci*, with articulated leaves. I shall therefore in the remainder of the paper employ the term "*transtilla*," for the raised transverse lines forming meshes; and for the more delicate ones within the meshes, that of "*lineolæ*."

I now add an enumeration of the German species of *Juncus*, with parallel diagnoses of their seeds; but in submitting this I must make a few remarks. The descriptions refer, as do those of Engelmann's paper, to the *external* aspect of the seeds in a dry state, taken from herbarium specimens; they do, therefore, not claim to supply the anatomical details, the real cause of these differences of sculpture. Such details, which can only be gathered from living specimens, must be reserved for future investigation; it is only with regard to the long caudate seeds that I have pointed out the great difference of the inner and outer testa, as in these it is of special importance. The observations are best made with reflected light, and a power of 50 × of a compound microscope: a simple microscope is less suited for looking over a large field. It has also to be borne in mind that the statements refer to seeds as ripe as possible. Seeds quite ripe are, however, not very plentiful, especially in alpine species, though most specimens for the herbarium are collected in fruit. Quite unripe seeds are flat or folded (but on account of the early hardening of the outer membrane but slightly shrivelled), sometimes resembling the well-known pockets (*taschen*) in *Prunus domestica*. Half-ripe seeds retain a more or less cylindrical form, but they are folded longitudinally, or, at all events, their ribs are much more prominent than at maturity. This point has to be well attended to, one being always inclined to classify such seeds with the "*seminibus costatis*;" and, to avoid

* I do not possess amongst my numerous specimens a single one with seeds quite ripe.

disappointment, one must try to obtain only seeds with a testa fully stretched out. The different shades of colour I have endeavoured to name in accordance with Willdenow's 'Grundriss der Kräuterkunde.'

1. *Juncus maritimus*, Lam. Semina fusiformia, caudata, nucleo oblique lanceolata; costata et inconspicue reticulata, areis lævibus; badia, caudis albis; long. 0·42–0·47''', nucleus 0·30–0·35'''; lat. 0·1–0·12'''.

2. *J. acutus*, L. Semina late ovata, longe vel recte vel oblique caudata; subtiliter reticulata, areis longitudinalibus lævibus; costæ et transtilla æqualia; ferruginea, caudis albis; long. 0·5–0·65, nucleus 0·35–0·4; lat. 0·2.

3. *J. Jacquini*, L. Semina longissime caudata, caudis rectis vel obliquis; nucleus lineari-lanceolatus, sæpe curvatus; multicostata, transtillis paucis inconspicuis, areis longitudinalibus lævibus; pallide ferruginea, caudis albis; long. 0·9–1·0, nucleus 0·43; lat. 0·13.

4. *J. conglomeratus*; L. Semina oblique obovata, apiculata; reticulata, areis transversis, lævibus cost. et transt. æqualibus; fusco-vitellina, apicibus nigris; long. 0·22–0·23; lat. 0·1–0·12.

5. *J. effusus*, L. Semina oblique ovata, brevissime apiculata; reticulata, areis transversis, lævibus, cost. et transt. æqualibus; vitellina, apicibus ferrugineis; long. 0·2–0·22; lat. 0·07–0·08.

6. *J. diffusus*, Hoppe (?).* Semina oblique conico-ovata, breviter apiculata; reticulata, areis transversis, lævibus; costæ valde inconspicuæ; vitellina, apicibus ferrugineis; long. 0·20–0·22; lat. 0·14–0·15.

7. *J. glaucus*, Ehrh.* Semina oblique ovata, lateribus planis, bre-

* *J. diffusus*, Hoppe. Under this name two different plants seem to be combined. Firstly, the sterile one from Ratisbon, which Schnitzlein and Frickhinger, probably with much justice, regard as a hybrid between *J. effusus* and *J. glaucus*; and secondly a plant which bears ripe fruit, and which I possess, from the Steinbecker Moor, near Hamburg (Chr. Luerssen), and from Dannenberg, on the Elbe (G. v. Pape). The latter has the deeply furrowed stems, with fan-shaped, articulated pith, and also the dark-brown vaginas of *J. glaucus*, and only differs from that species by its broader and more obtuse capsule. This character, however, is but of slight value, as even the genuine *J. glaucus* has more or less acute fruit. The seeds described above, being those of the so-called *J. diffusus* from Dannenberg, scarcely differ from those of *J. glaucus*, only the longitudinal ribs are markedly obscure, and the seeds of *J. glaucus* are compressed on the sides, which may be owing to the greater number of developed seeds. I therefore do believe that the above-mentioned plants ought to be referred to *J. glaucus*, but should recommend the fertile *J. diffusus* to the attention of botanists. But in the diagnosis of *J. glaucus* the description of the fruit, "*capsula oblongo-elliptica obtusa mucronata*," ought to be altered into "*capsula elliptica, obtusa mucronata*," as the capsule is indeed rather broad-elliptical than oblong-elliptical.

viter apiculata; dorso regulariter reticulata, lateribus tenuissime transverse reticulatis, areis lævibus; ferruginea; long. 0·23; lat. 0·13–0·14.

8. *J. paniculatus*, Hoppe.* Semina . . . apiculata; areis transversis reticulata; ferruginea; long. 0·24; lat. ca. 0·15.

9. *J. Balticus*, Willd. Semina ovalia vel obovata, brevissime apiculata; reticulata, areis paulo transversis; griseo-fusca; long. 0·28–0·35; lat. 0·16–0·2.

10. *J. Arcticus*, Willd. Semina oblique obovata, apiculata; reticulata, areis lævibus;† pallide ferruginea; long. 0·3–0·32; lat. 0·15–0·18.

11. *J. filiformis*, L. Semina oblique obovata, brevissime apiculata; reticulata, areis lævibus;† vitellina, apice ferruginea; long. 0·2–0·21; lat. 0·12–0·13.

12. *J. stygius*, L. Semina ovato-lanceolata, longe apiculata; costata, costis numerosissimis areas tenues acutas formantibus; straminea; long. 0·7–1·0; nucleus 0·4–0·6; lat. 0·3.

13. *J. castaneus*, Smith. Semina scobiformia (longissime caudata), caudis obliquis; costata, costis numerosissimis, areas tenues acutas formantibus; ferruginea, caudis albis; long. 1·25–1·4, nucleus 0·35–0·42; lat. 0·18–0·2.

14. *J. triglumis*, L. Semina scobiformia, nucleo elongato-ovali; costata; costis numerosis, transtillis perpaucis inconspicuis; pallide ferruginea, caudis albis; long. 0·8–1, nucleus 0·3; lat. 0·13–0·18.

14a. *J. biglumis*, L.‡ Semina scobiformia, nucleo ovato; costata, transtillis numerosis inconspicuis (areis fere quadratis); pallide ferruginea, caudis albis; long. 0·55–0·6, nucleus 0·3–0·35; lat. 0·2.

* My specimens of *J. paniculatus*, Hoppe, having only unripe seeds, which are quite compressed, the description given above is unsatisfactory. The plant differs, however, from the other species by its stouter, branched, and paler inflorescence, whilst the dark-brown sheaths and stems correspond with those of *J. glaucus*. It hardly deserves to be separated specifically from *J. glaucus*.

† In a dry state both plants exhibit a regular reticulation, in which neither ribs nor transverse lines are prominent, but the reticulation is often obscured by strong wrinkles of the thick, outer membrane. I do therefore not approve of Dr. Engelmann referring *J. Arcticus* to the group with ribbed seeds, and *J. filiformis* to that with reticulate. Respecting the appearance of the seeds after soaking, and the structure of the inner and outer membrane of testa see below.

‡ *J. biglumis*, Linn., I have enumerated on account of its close relationship with *J. triglumis*, although this species is peculiar to the extreme north, and does not occur in the Alps.

15. *J. trifidus*, L. Semina ovata vel pyramidata, irregulariter a latere compressa in vertice breviter caudata; multicostata, costæ transtillis subtilibus, obliquis conjunctæ, areis hic illic transverse lineolatis; nigro-fusca, cauda alba; long. 0·6–0·8, nucleus 0·48–0·7; lat. 0·3–0·4.

16. *J. monanthos*, Jacq. Semina lanceolata, acuta, irregulariter compressa, breviter caudata; multicostata, costæ transtillis obliquis conjunctæ, areis longitudinalibus lævibus, interdum etiam lineolatis, transtillis subtilioribus; straminea; long. 0·7–0·9, nucleus 0·45–0·5; lat. 0·25–0·35.

17*. *J. pygmæus*, Rich. Semina pyriformia vel obovata, brevissime apiculata; regulariter reticulata, areis tenuissime transverse lineolatis; ferruginea; long. 0·16–0·18; lat. 0·1–0·11.

18. *J. capitatus*, Weig. Semina lanceolato-ovata, apiculata; regulariter reticulata (costis et transtillis æqualibus) areis lævibus; pallide ferruginea, apicibus ferrugineis; long. 0·17–0·18; lat. 0·8–0·1.

19. *J. obtusiflorus*, Ehrh. Semina elongato-pyriformia, recte apiculata; regulariter reticulata, transtillis subtilioribus, costis crenatis, areis subtilissime punctatis†; vitellina; long. 0·2; lat. 0·1–0·12.

20. *J. sylvaticus*, Reich. Semina elongato-lanceolata, pene fusiformia, apiculata; regulariter reticulata, areis lineolatis; vitellina, apicibus ferrugineis; long. 0·25; lat. 0·08–0·1.

21. *J. lampocarpus*, Ehrh. Semina obovata, apiculata; regulariter reticulata, areis transverse lineolatis; vitellina, apice ferruginea; long. 0·22–0·25; lat. 0·1–0·13.

22. *J. atratus*, Krock. Semina lanceolata vel lanceolato-obovata, apiculata; regulariter reticulata, areis transverse lineolatis; pallide ferruginea, apice ferruginea; long. 0·22–0·24; lat. 0·08–0·1.

23. *J. Alpinus*, Vill. Semina lanceolata vel lanceolato-obovata, breviter apiculata: regulariter reticulata, areis transverse lineolatis; pallide ferruginea, apice ferruginea; long. 0·22–0·25; lat. 0·11–0·13.

* I enumerate this species instead of *J. triandrus*, Gouan (which is only a slight variety of the German *J. capitatus*); and I am the more prompted to do so as it occurs in the Downs of the North Friesian Islands. That it ought to bear the name of *J. pygmæus*, Rich., instead of *J. pygmæus*, Thuill., has already been shown by me. (Bot. Zeitung, 1865, n. 26.)

† *J. obtusiflorus* alone of all the German species has these delicate points, which appear as if engraved.

24. *J. supinus*, Mch. Semina obovata, apiculata; regulariter reticulata, areis transverse lineolatis; vitellina, apice ferruginea; long. 0·21–0·24; lat. 0·12–0·13.

25. *J. squarrosus*, L. Semina oblique obovata s. turbinata, irregulariter compressa, non apiculata; grosse, sed regulariter reticulata, areis lævibus; brunnea; long. 0·3–0·35; lat. 0·18–0·2.

26. *J. compressus*, Jacq. Semina late obovata s. oblique obovata, apiculata; transverse reticulata, costis fractis grossis, areis lævibus; badia, apice fere nigra; long. 0·18–0·2; lat. 0·9–0·12.

27. *J. Gerardi*, Lois. Semina turbinata, obovata vel oblique obovata, apiculata; transverse reticulata, costis fractis grossis, areis lævibus; ferruginea, apice nigro-ferruginea; long. 0·22–0·26; lat. 0·12–0·15.

28. *J. tenuis*, Willd. Semina oblique obovata s. lanceolato-obovata, apiculata; transverse lineata (costis inconspicuis), areis transversis, subtilissime lineolatis (?);* pallide ferruginea, apice ferruginea; long. 0·22–0·26; lat. 0·08–0·1.

29. *J. Tenageja*, Ehrh. Semina lanceolato-obovata, obliqua, apiculata; regulariter reticulata (costæ inconspicuæ numerosæ, transtilla subtiliora), areis subtilissime lineolatis (?);* vitellina, apice ferruginea; long. 0·15–0·2; lat. 0·06–0·09.

30. *J. sphærocarpus*, N. v. E. Semina ovata, vel obovata, oblique et brevissime apiculata; subtiliter reticulata (costis inconspicuis) areis transversis, minimis, lævibus; ferruginea; long. 0·14–0·18; lat. 0·08–0·1.

31. *J. bufonius*, L. Semina doliiformia, retusa, brevissime apiculata; subtiliter reticulata (costis inconspicuis), areis transversis, lævibus; pallide ferruginea, apice ferruginea; long. 0·18–0·22; lat. 0·1–0·15.

From the foregoing, it will be easy to form some conception of the differences observable in the German species of *Juncus*. In the first instance, the species with caudate seeds (*J. maritimus, acutus, Jacquini, stygius, castaneus, triglumis, biglumis, tripodus*, and *monanthos*) must be grouped together. Their seeds are either ovate, and only with short appendages (*J. trifidus*), lancet-shaped (*J. stygius* and *monanthos*), or fusiform or scrobiform (*J. maritimus, acutus, Jacquini, castaneus, tri-*

* This is an extremely delicate unevenness in the base of the meshes, either owing to very fine but prominent granules, or (what is essentially the same) a system of extremely delicate, impressed, reticulate lines.

glumis, and *biglumis*). In length they are the largest (being 1·4 line in *J. castaneus*); and even after deducting the appendage the body of the seed is much larger than that of the other species. The ecaudate seeds are mostly about $\frac{1}{4}$ line long; on the average the seeds of *J. Tenageja*, *sphærocarpus*, *compressus*, *pygmæus*, and *capitatus* are about $\frac{1}{5}$ line smaller. The seeds of *J. Balticus* are considerably larger than the average size (being as large as $\frac{1}{3}$ line), *Arcticus* (which is nearly as large as the foregoing), and *J. squarrosus* (which is the same size as *J. Balticus*). In nearly all caudate seeds the ribs of the testa are very prominent, and the meshes formed by them are nearly always arranged lengthwise (*J. Jacquini*, *acutus*, *stygius*, *castaneus*, *triglumis*, *trifidus*, and *monanthos*); we find meshes of nearly equal length in *J. maritimus* and *biglumis*. Transversely-placed meshes do, of course, not occur where the ribs are very much developed; and if in some parts of the seeds of *J. trifidus* and *monanthos* elevated transverse, pretty equidistant, lines are often noticed within the longitudinally-placed meshes of the external membrane; these transverse lines are on the inner brown membrane, and glimpses of it can only be caught in places where the outer membrane is dried up. A very regular rectangular reticulation, with delicate, transversely-striated meshes, occurs in the species with articulated leaves. *J. pygmæus*, *sylvaticus*, *lampocarpus*, *atratus*, *alpinus*, and *supinus* agree in this respect; whilst *J. obtusiflorus* differs from them by its delicately-dotted meshes. Regular reticulation, with smooth meshes, occurs in *J. capitatus*, *squarrosus*, and *Balticus*. Closely packed transverse meshes ("*semina lineolata*") of Engelmann—a term which becomes intelligible when it is borne in mind that indeed the elevated transverse lines are the most prominent of all—are noticed in *J. conglomeratus*, *effusus*, *glaucus* (curiously enough only on the sides of the seeds, whilst the back has a regular reticulate system of ribs), *paniculatus*, *tenuis*, *Tenageja*, *sphærocarpus*, and *bufonius*. The ecaudate seeds are generally oblique, obovate or pear-shaped, seldom lancet-ovate (*J. capitatus*, *Tenageja*, *atratus*, and *alpinus*), truly elongate-lancet (*J. sylvaticus*) or doliiform (*J. bufonius*). The raphe is mostly shorter than the outer strongly-curved side of the seed, to which the obliquity of the seed is due. The chalaza is in appearance like a projecting point, easily distinguished from the other parts of the seed by its much darker colour.

In conclusion, let us turn to the seeds of our species of *Luzula*.

We are at once struck with their size, which, of course, is accounted for by the fact that in *Luzula* there are only three seeds in each capsule, whilst *Juncus* is many-seeded. The seeds of all species are also of a very dark colour. Yellow seeds, like those of *Juncus effusus*, do not occur; but, on the other hand, they are often ferrugineous, and very dark brown. In outline the seeds are not so oblique as those of *Juncus;* they oscillate between elongate-ovate and rotundate-ovate. Those of *L. pediformis* are very peculiar, being nearly peltate. The outline is, however, variously affected by the appendicule, which in *L. Forsteri*, *pilosa*, and *flavescens* projects beyond the chalaza, the point on the apex of the seed, and the papillose projection at the hilum (*L. campestris*, *pallescens*, and *caricina*). *L. pediformis* is again peculiar in this respect, its funiculus terminating at the base in a papille, and at the apex in a pointed appendix, so that this species forms an intermediate link between the first and third group. The finer sculpture of the testa in *Luzula* is, however, much more simple than in *Juncus*, there being merely either a regular or longitudinally-stretched reticulation, caused by the dissepiments of the cells of the testa. The membrane of the meshes is either even or concave, and often with rather longitudinal wrinkles,— perhaps owing to the process of drying. Delicate transverse lines on the membrane of the meshes I found only in the curious *L. pediformis*.

1. *Luzula pilosa*, Willd. Semina orbiculari-ovata, obtusissima, in apice superiore appendice oblique cultriformi instructa; indistincte regulariter reticulata et subrugosa, subnitida; brunnea, appendice alba; long. 0·7‴ (cum app. 1·0, app. 0·6); lat. 0·5–0·6‴.

2. *L. flavescens*, Gaud. Semina late obovata, appendice obliqua cultriformi acuta; regulariter reticulata et indistincte longitudinaliter rugosa, subnitida; ferruginea, appendice vitellina; long. 0·75–0·8 (cum app. 1·6–1·7); lat. 0·4.

3. *L. Forsteri*, De Cand. Semina orbiculari-ovata, obtusa, appendice obliqua in funiculum decurrente instructa; regulariter reticulata, areis subrugosis, subnitida; brunnea, appendice vitellina; long. 0·5–0·65 (cum app 1·0); lat. 0·45–0·5.

4. *L. sylvatica*, Gaud. Semina ovata, apiculata; regulariter reticulata, areis subrugosis, subnitida; brunnea, apice grisea; long. 0·8; lat. 0·35.

5. *L. Pedemontana*, Boiss. Semina oblique ovata, breviter apicu-

lata; regulariter reticulata, areis subrugosis, nitida; brunneo-nigra; long. 0·65–0·75; lat. 0·35.

6. *L. nivea*, De Cand. . . .

7. *L. nemorosa*, E. M. Semina oblique-ovata, apiculata; longitudinaliter reticulata, areis lævibus, nitida; brunnea, apice et funiculo vitellinis; long. 0·6–0·65; lat. 0·26–0·3.

8. *L. lutea*, De Cand. (*immatura!*) Semina oblique-ovata, apiculata; longitudinaliter reticulata?, nitida; ferruginea, apice et funiculo vitellinis; long. 0·6–0·63; lat. 0·3.

9. *L. parviflora*, De Cand. Semina ovalia, apiculata; longitudinaliter reticulato-rugosa, subnitida; brunnea; long. 0·6–0·65; lat. 0·22–0·25.

10. *L. spadicea*, De Cand.*

11. *L. glabrata*, Koch. . . .

12. *L. spicata*, De Cand. Semina obovata, apiculata; regulariter reticulata et inconspicue rugosa, subnitida; ferruginea, apice et funiculo vitellinis; long. 0·5–0·6; lat. 0·25–0·3.

13. *L. pallescens*, Bess.† Semina ovata, obtusa, basi papillata; longitudinaliter rugoso-reticulata, nitida; brunnea, papilla basilaris alba; long. 0·45–0·5; lat. 0·25–0·28.

14. *L. campestris*, De Cand.‡ Semina late ovalia, obtusissima, basi caruncula magna instructa; longitudinaliter reticulata et inconspicue rugosa, nitida; brunnea, caruncula luteo-alba; long. 0·7–0·8 nucl. 0·5; lat. 0·4–0·5.

15. *L. pediformis*, De Cand. Semina magna, late obovata, obtusissima, intus plana, extra convexa longe apiculata; longitudinaliter reticulata, areis lævissimis transverse lineolatis, nitida; dilute ferruginea, apice, papilla basilari et funiculo luteis; long. 1·1–1·2; lat. 0·6–0·65.

* Of this species I only possess unripe seeds, which seem to be like those of *L. parviflora*.

† The form *L. pallescens*, *β. nigricans*, from the height of the Sudetes. I do not possess fruiting specimens of the pale form of the valleys.

‡ The size of the basilar caruncule is subject to much variation. In the mountain and alpine forms it seems to be smaller than in the genuine *L. campestris* of the plains, but I always found it larger than in the form of *L. pallescens* described above.

MEMORANDA.

Dioicous forms of Vitis vinifera, *L.*—On page 42 of the Proceedings of the Academy, I offered a few observations tending to show that the idea of De Candolle (since adopted by others), that Dioicousism was a peculiar attribute of the American species of *Vitis* and Hermaphroditism of the European was an error, and one which, as it had been adopted as a fact to divide the genus, ought to be corrected; and further, I suggested that the seedless grapes of Europe (Currants) were probably pistillate forms. This has produced two letters from Dr. George Engelmann, of so much interest that, with his knowledge, I make the following extracts:—

"It is a well-known fact that *V. vinifera*, when running wild, as it occurs in different localities on the banks of the Rhine, becomes polygamous; and I have specimens of male plants in my herbarium. The berries are small, acerb, and dark bluish-black.

"The same, I have learnt from Prof. Parlatore, of Florence, grows in the swampy region near Leghorn, and is as large a plant there as our largest *V. cordifolia* (or *viparia*),—a hundred feet high, and (stem) six or eight inches in diameter,—and is there yet called 'Labrusca' by the natives,—the ancient name used also by Virgil and Pliny, showing the same plant to be wild (native or naturalized?) at their time. This is also said by Professor Parlatore to be dioicous, or rather polygamous.

"The number of seeds does not depend on the fertility of the plant, but on the size of the berry; thus our small berries, *V. cordifolia* (*viparia*), bear usually one or two seeds, rarely, if ever, more.

"The question with me is whether the plant is ever properly dioicous? I have never found female plants. All that I could examine were either male or hermaphrodite, though the hermaphrodite may not be absolutely *perfect*,—that is, though the pollen is perfect, it may require the pollen of another (male or hermaphrodite) plant to fertilize it.

"Has any one seen purely female plants?

"Your hypothesis of the seedless Currants I cannot share. If not impregnated, the fruit will come to nothing; but there are seedless varieties of different plants you know."

In another letter, in reply to some suggestions of mine, Dr. Engelmann adds: "I was too hasty in saying that a non-fertilized fruit would not ripen. Those with a fleshy calyx (epigynous) often do, without producing seeds; but of grapes I would doubt it. And, *moreover*, I do not know—and would like botanists to look to it—whether *female* flowers are found in *Vitis!* I find only complete or male plants,—have never seen a purely female. If no one has, will they look out next season?"

These extracts confirm my views in reference to the existence of imperfect forms of *V. vinifera*, and they open up an interesting inquiry as to the cause of seedless raisins. One of our fellow-members suggests that my hypothesis, that they are pistillate forms, imperfectly developed through lack of fertiliza-

tion, is unlikely, because, with so many vineyards of perfect grapes, at times some of these would get fertilized from stray pollen, and thus we should occasionally find seeds in dried corinths, which we do not. But old writers on the corinth say that berries with seeds are found at times amongst the others, in which case they are double the size (see Prince's Treatise on the Vine, pp. 97, 98, copied, probably, from Duhamel). They are, perhaps, rejected when the currants are being prepared.

However, the object of my note was to refer to the *fact* of the existence of male plants; and the hypothesis in reference to the seedless grapes was introduced rather to stimulate inquiry as to what the facts really are in relation to their real nature and organization.—*Thomas Meehan, in Proc. Philadelphia Acad.* 1867, pp. 98, 99.

NEW PUBLICATIONS.

The Chinchona Species of New Granada, containing the Botanical Descriptions of the Species examined by Drs. Mutis and Karsten; with some account of those Botanists, and of the results of their labours. By Clements R. Markham, F.L.S. With Notes by J. E. Howard. London: Printed for Her Majesty's Stationery Office. 1867. 8vo. 140 pp.

The Chinchonological writings of Dr. Mutis, a Spanish botanist, whom Humboldt and Bonpland visited at Bogotá in New Granada, after being buried for fifty years in a toolshed at Madrid, have at last seen the light. We wish we could add that Mr. Markham, to whom we are indebted for rescuing them, had also succeeded in obtaining copies of the plates by which they are illustrated, for without them we are in reality not much wiser than we were before, having to rely for our identification of the species and "varieties" of Mutis to imperfect botanical descriptions, in which some of the most essential, even generic, characters are omitted; and we therefore trust that Mr. Markham and Mr. Howard, in the interest of science, will spare no pains to get possession of these illustrations, as they are in fact morally bound to do, after throwing so many synonyms on our hands without clearing them up. Indeed, the barks of New Granada and Columbia in the widest (Bolivarian) sense, would form a suitable companion volume to Mr. Howard's justly esteemed 'Quinologia of Pavon.'

The writings of Mutis on the bark-trees of New Granada are supplemented by those of Dr. Karsten, well known in their German dress,

and here reproduced in English for the benefit of those ignorant of that language.

Mr. Howard, it is well known, has always given Mr. Karsten due credit for what he has done and the courtesy he has shown him:—"I have," says Mr. Howard, "before expressed my conviction of the great value of his researches, and of the accuracy (as far as I can judge) of his descriptions. . . . I have now only to reiterate those remarks, and to express my cordial satisfaction at the reprint of such interesting information in the English language. I must, however, confine my approbation to Dr. Karsten's record of his own researches, which did *not* extend to the barks of Bolivia and Peru."

At the end of this volume, "A *complete* List" of the species ever referred to the genus *Chinchona* is given, filling four and a half pages. But we regret to add that, doubtless in consequence of the sudden departure of Mr. Markham for Abyssinia, the proofs of this list (and in a less degree those of the whole book) have been so slovenly read that it is full of misprints. We counted in it no less than seventy, on a superficial perusal. Nor can we accept it as a complete enumeration of all the species ever referred to *Chinchona*, the following names being absent, and many more might be found by carefully going through generally accessible publications, viz.:—*C. Bonplandiana*, Kl.; *C. Capensis*, Burm.; *C. discolor*, Kl.; *C. excelsa*, Ham.; *C. glabra*, Ruiz; *C. Lambertiana*, Bartl.; *C. Morado*, Ruiz; *C. nitida*, Benth.; *C. obtusifolia*, Dietr.; *C. pallescens*, Ruiz; *C. paniculata*, Dietr.; *C. pauciflora*, Tafalla, Hartung; *C. rotundifolia*, Pav.; *C. rubicunda*, Fée; *C. scabra*, Lodd.; *C. tenuis*, Ruiz; *C. vanilliodora*, Fée. Nor are the species excluded by modern researches from *Chinchona* always referred to the right genus; for instance, *C. corymbiflora*, Forst., is not an *Exostemma* but a *Badusa*, A. Gray. We should also have been glad to see the usual sign of identification used when a species is transferred to another genus (viz. =), instead of a comma; it would have made the whole so much clearer.

We shall allow Mr. Markham to give his own account of the work of Mutis, which is entitled 'El Arcano de la Quina,' and divided into four parts.

"He commenced its publication in a periodical called 'El Diario,' at Bogotá, in 1793–94, and an incomplete abstract of the first two parts afterwards appeared in the 'Mercurio Peruano.' But Mutis appears to have subsequently

almost rewritten the work, and he delivered the complete manuscript to Don Ignacio Sanchez Tejada, secretary to the Viceroyalty of Santa Fé, for publication. This gentleman arrived at Madrid in February, 1807, but, just as the printing was about to commence, the French invaders, who have so many other sins to answer for in Spain, occupied the capital. The 'Arcano de la Quina' was left amongst a heap of other books and papers. It accidentally fell into the hands of a Spanish physician, Don Manuel Hernandez de Gregorio, who published the first three parts, relating to the medicinal properties of Chinchona bark, in 1828.

The first part is on the errors that must exist in the administration of quina bark, while ignorance and confusion prevail concerning the different species. Mutis says that, in times immediately succeeding the discovery of *quina*, only one species was known in Europe, namely, that of Loxa, which he calls *quina naranjada*. He says that it was procured by barking the trees as high as the collector's arm would reach, and that only the thick trunk-bark was taken in those early times. The bark usually arrived in Europe in a very bad condition, owing to the rude operations of the collectors in drying it, and sewing it up in damp hides, and the no less culpable negligence of merchants. This was the state of affairs during the first century of the trade (1640–1740). The bark was broken into small pieces and enveloped in its own damp powder. After being shipped from Payta, it was sent by Panama to Portobelo, where it suffered further injury by long detention in damp hot warehouses. In 1776, a Royal Order prohibited the exportation of bark from Payta, and directed that all Peruvian and Quito bark should be shipped from Callao, and all the New Granada bark from Cartagena. At about the same time the bark collectors began to cut the trees down instead of barking them while standing, with a view to gathering the bark from the branches as well as from the trunk. It was intended also that shoots should thus spring up from the old stools.

The second part of the work of Mutis is devoted to a discussion of the medicinal virtues of *quina* bark. Owing to advances in medical science since the days of Mutis, this portion of his work is now of no value. He divides the Chinchona genus into four species, and attributes special medicinal qualities to each, viz.:—

1. *C. lancifolia* (*quina naranjada*), Orange bark. *Febrifuge.*
2. *C. oblongifolia* (*quina roja*), Red bark. *Indirectly febrifuge.*
3. *C. cordifolia* (*quina amarilla*), Yellow bark. *Tonic.*
4. *C. ovalifolia* (*quina blanca*), White bark. *Tonic.*

In this classification Mutis displays an extreme love of generalizing on insufficient and false data. Nos. 2 and 4 are not medicinal Chinchonæ at all, and he himself confesses that the *quina blanca* was never appreciated in the trade.

The third part gives some further information on the use of bark, as then practised; but the controversies of the faculty, now sixty or eighty years old, can no longer be either interesting or instructive. It is, however, curious to find Mutis writing on the subject of Chinchona cultivation in this strain:—'The due conservancy of the *quina* trees in our forests will obviate the neces-

sity of having recourse to the very difficult, costly, and probably impracticable project of forming *quina* plantations.'

The fourth part of the 'Arcano de la Quina' has never before been printed. Yet it is the only part which is now of any practical value, as it contains the botanical descriptions of the Chinchona species of New Granada, which were discovered by Mutis. Not being medicinal, this part was uninteresting to Dr. Gregorio, the editor of the three other parts of the work. It has remained in manuscript, in a building in the botanical gardens at Madrid, until now, together with a large bundle of dried specimens marked *Chinchonæ*, but, as Caldas bitterly complained, without labels or notes. There are also a number of coloured drawings of *Chinchonæ* in the same room, together with upwards of 20,000 drawings of other plants, and 5000 beautiful coloured drawings by the South American disciples of Mutis. The whole collection is in a lamentable state of confusion and neglect, and is likely to remain so. There seems to be no hope that the present or any future government of Spain will go to the expense of publishing the results of labours undertaken under the auspices of their more worthy predecessors in the days of Charles III.

The fourth part of the work of Mutis commences with a synoptical table of the species which he subsequently describes. They are seven in number, four of which (being those already mentioned in the second part) he classes as having hairy corollas :—

C. lancifolia, *C. oblongifolia*,
C. cordifolia, *C. ovalifolia*,

and three as having smooth corollas :—

C. longiflora, *C. parviflora*.
C. dissimiliflora,

Only two of these would be considered as true *Chinchonæ* by Dr. Weddell, namely, *C. lancifolia* and *C. cordifolia*.

Mutis commences his botanical descriptions with a carefully rewritten description of the genus. Then follows the *C. lancifolia* with 3 varieties (α to γ); the *C. cordifolia* with 5 varieties; the *C. oblongifolia* with 3 varieties; the *C. ovalifolia* with 3 varieties; the *C. longiflora*; the *C. dissimiliflora*, and the *C. parviflora*. The *C. lancifolia* is still considered to be a valuable true Chinchona, as is also the *C. cordifolia* probably. But the *C. oblongifolia* is the *Cascarilla magnifolia* of Weddell; the *C. ovalifolia* is the *Cascarilla macrocarpa* of Weddell; the *C. longiflora* is the *Cosmibuena obtusifolia* of Ruiz and Pavon; the *C. dissimiliflora* is the *Exostemma dissimiliflorum*, and the *C. parviflora* is doubtful."

Mr. Markham avails himself of this opportunity to break another lance in favour of the true spelling of the genus *Chinchona*, and we reproduce with pleasure his arguments, which seem to us unassailable :—

"Linnæus, who first described it, chose the most appropriate name for it that could possibly have been selected, namely, that of the noble lady who had first made its healing virtues known. But most unfortunately Linnæus was

misinformed as to the name of her whom he desired to honour This is to be accounted for by his having received his knowledge of the Countess of Chinchon through a French and not a Spanish source. Thus misled, Linnæus spelt the name *Cinhona* and *Cinchona*, omitting one or two letters; but the fact that he altered the spelling in his different editions, proves beyond any doubt that he desired to spell the word correctly. It was still more unfortunate that Linnæus died before the error was pointed out and corrected. This was done by the Spanish botanists Ruiz and Pavon, who landed in Peru in 1778, the very year of the death of Linnæus. These learned men strongly advocated the correct spelling of that *Chinchona* genus, to the study of which they had devoted so much time, and exposed themselves to so many hardships and dangers. The *Chinchona* genus is also spelt correctly by Mutis, Zea, Caldas, Tafalla, and all the great Spanish authorities; as well as by Howard, Spruce, Seemann, and others who have written on the *Chinchona* genus in later times. No writer is so ignorant as to contend that *Cinchona* (which is unmeaning, as *cinchon* is a policeman's belt) or *Cinhona* (*cinhon* means nothing at all) is the correct way of spelling. All admit that *Chinchona* is right; but some botanists persist in spelling the word wrong, because they allege that the incorrect form is generally received, and that a change would cause confusion. But this is far from being the case. The majority of leading authorities who have written on the genus, spell it correctly; namely, Pavon, Ruiz, Tafalla, Zea, Caldas, Mutis, Lopez, Rodriguez, Cavanilles, La Gasca, Howard, Seemann, and Spruce; and it is correctly spelt in the reports of cultivators, in the Parliamentary blue-books, and in official correspondence. So that a continuance of the wrong spelling is very inconvenient and confusing to the increasing number of persons who are practically interested in the *Chinchona* genus; as well as barbarous and illiterate. Most botanical names are means, not ends, and, their uses as means once established, botanists have plausible grounds for persisting in spelling them wrong, when an error is generally adopted. But the error now under discussion has never been generally adopted; on the contrary, it has been protested against almost from the very first, while the name for the *Chinchona* genus is an end, and a very important one, as well as a means. It was not given as a mere distinguishing label, but was selected for an excellent reason connected with the history of the genus. The object was to immortalize the famous deed of the Countess of Chinchon by calling the genus after her (*Chinchona*); an object which is entirely thwarted by calling it after a policeman's belt (*Cinchona*).

The value of this publication is much enhanced by a series of footnotes from the pen of Mr. Howard, in which he brings his long and intimate knowledge of the subject to bear upon the various points under discussion, and rectifies many errors into which the writers, whose works are here reproduced, have fallen, and into which all pioneers of new or little-known fields must expect to fall.

BOTANICAL NEWS.

Mr. C. Bænitz, of Kœnigsberg, has issued a new part of his collection of dried plants of Northern and Central Germany, comprising the *Juncaceæ* and *Cyperaceæ*. The whole of this set, comprising *three* fascicles (price 18*s*.), may be ordered from Mr. E. Remer, of Gorlitz, publisher.

Dr. Buchenau has figured and described a variety of *Lapageria rosea* which possesses considerable horticultural interest, it having six instead of three inner perigonal leaves.

The second issue of the fifth edition of Professor Asa Gray's 'Manual of the Botany of the Northern United States'—that model of a good local Flora—has come to hand, and might with justice be considered a new edition, comprising, as it does, many small corrections, typographical and other, as well as more considerable alterations and additions.

The New York 'Nation' of March 19 contains a review of Darwin's 'Variation of Animals and Plants under Domestication,' in which it is reiterated that Dr. Wells, an American, in an anthropological paper read in 1813 before the Royal Society, was the first who recognized the principle of natural selection. But in 1865, Professor Schultz-Schultzenstein already pointed out that natural selection was but another name for Epigenesis, which Blumenbach developed in his celebrated treatise 'De Generis Humani Varietate Nativa,' published in 1775, and that, therefore, whatever merit there might be in having originated the theory was due to the great German naturalist.

EDINBURGH BOTANICAL SOCIETY, *February* 13*th*.—Charles Jenner, Esq., President, in the chair. The following communications were read :—1. Notice of Botanical Excursions in the Highlands of Scotland during the Autumn of 1867. By Professor Balfour. 2. On Plants and Animals used for Food in Old Calabar. Extracted from the MS. journals of the late Mr. W. G. Milne, by Mr. John Sadler. 3. Remarks on Species of *Elymus*, *Triticum*, and *Phleum*, from Vancouver's Island. By Professor Balfour. Under the name of Bunch-grass, several kinds of grasses have been sent from Vancouver's Island and Columbia. Two distinct plants have been sent by Mr. Robert Brown to the Botanic Garden under that name. One is a species of *Triticum*, perhaps a variety of *T. repens*, of which specimens are now shown. The other is an *Elymus*, which appears to be the *E. condensatus* of Presl. In this I am confirmed by Colonel Munro, who has devoted much attention to grasses. Another plant sent turns out to be a *Phleum*, resembling *P. pratensis*, although growing to a larger size. 4. Report on the Open-Air Vegetation in the Royal Botanic Gardens. By Mr. M'Nab.

We are requested to insert the following announcement :—"Monsieur Reverchon, botaniste à Briançon, Hautes Alpes, en France, continue d'explorer pour la botanique, toutes les Alpes du Dauphiné, de la Savoye et du Piémont. La bonne préparation et le grand nombre de spécimens complets, composant chaque centurie de ses plantes, compensent largement l'augmentation de prix qu'il a été obligé de faire subir à ses collections, lesquelles sont fixées irrévocablement à 20 francs les 105 espèces. Les centuries sont expédiées et emballées avec le plus grand soin."

W Fitch, del et lith.

Vincent Brooks, Imp

REVISION OF THE NATURAL ORDER HEDERACEÆ.

By Berthold Seemann, Ph.D., F.L.S.

(*Concluded from Vol. VI. p.* 142.)

XVII. On the Genus Maralia.

(Plate LXXX.)

Bentham and Hooker fil. ('Genera Plantarum') referred my genus *Oligoscias* to *Panax*, from which, as limited by me, it differs by its pentacarpous fruit and valvate petals. It proves, however, to be identical with the little-known genus *Maralia*, Petit Thouars.

XXXV. Maralia, Petit Thouars, Nov. Gen. Madag. p. 13, n. 43; De Cand. Prodr. iv. p. 255.—Pedicelli articulati. Flores ecalyculati, hermaphroditi. Calycis tubus turbinatus, limbo 5-dentato. Petala 5, ovato-triangularia, libera, æstivatione valvata. Stamina 5, filamentis brevibus, antheris oblongis. Ovarium inferum, 3–5-loculare, loculis 1-ovulatis. Styli 3–5, filiformes, omnino liberi, stigmatibus punctiformibus. Drupa baccata, ovato-oblonga, 3–5-pyrena. Albumen ruminatum.—Frutex Madagascariensis, inermis, foliis exstipulatis pinnatis 2–3-jugis cum impari, petiolis supra canaliculatis, foliolis lateralibus sessilibus, terminali petiolulato, infimis subrotundatis substipulæformibus, supremis ovatis v. ellipticis, basi acutis, acuminatis, 3–5-setaceo-dentatis; umbellis 5–8-floris, longe pedunculatis; pedicellis filiformibus (6–8 lin. long.); floribus drupisque albis.—*Oligoscias*, Seem. Journ. of Bot. iii. p. 179. Species unica:—

1. *M. Madagascariensis*, De Cand. l. c.—*Oligoscias Madagascariensis*, Seem. Journ. of Bot. iii. p. 179. *Aralia Maralia*, Schult. Syst. vi. p. 704. *Panax Maralia*, Dcne. et Planch. in Rev. Hortic. 1854, p. 105. —Madagascar, Betroun, Tamatave and Antananarivo, on clay hills 2000–3000 feet above the sea. (Meller! Lyall! n. 232, and others.)

Explanation of Plate LXXX., representing *Maralia Madagascariensis*, from specimens obligingly lent by Dr. Hooker.—Fig. 1. Flower-bud. 2. Open flower. 3. Stamens. 4. Ovary, far advanced. 5. The same, cut across. 6. Seeds:—all, with figure on right-hand side of 6, magnified.

XVIII. On the Genus Eleutherococcus.

XXXVI. Eleutherococcus, Maxim. Prim. Fl. Amur. p. 132; Bth. et Hook. f. Gen. i. p. 941.—Pedicelli articulati. Flores ecalyculati,

polygami. Calycis margo vix prominulus, integer v. minute dentatus. Petala 5, rarius 6–7, submembranacea, æstivatione valvata. Stamina tot quot petala; antheræ ovato-oblongæ. Discus convexus, in conum v. columnam stylorum abiens. Ovarium 5- rarius 6-7-loculare. Stylus 1, stigmate terminali. Drupa baccata, globosa, siccitate sæpe angulata; pyrenæ crustaceæ, a latere compressæ. Semen planum. Albumen æquabile.—Frutex Amurensis, aculeatus, foliis digitatim 5-foliolatis, foliolis membranaceis serrulatis, stipulis vix prominulis v. nullis; umbellis solitariis v. paucis, sæpius geminis, bracteis minutis caducis v. nullis.

In habit closely resembling some digitate-leaved Indian *Aralias*, but differing from them in its valvate corolla and single style.

1. *E. senticosus*, Maxim. l. c.; Regel, Gartenflora, 1863, tab. 393. —*Hedera (?) senticosa*, Rupr. et Maxim. olim.—Forests of Manchuria, where it forms part of the underwood (Maximowicz!).

XXV. On the Genus Astrotricha.

XLIII. Astrotricha, De Cand. Prodr. iv. 74, et Mem. Omb. 29. t. 5, 6; Benth. et Hook. Gen. Plant. i. p. 937; Benth. Fl. Austr. iii. p. 379.—Pedicelli articulati. Flores ecalyculati, hermaphroditi. Calycis tubus ovatus; limbus minimus, vix 5-dentatus. Petala 5, ovalia, subacuta, æstivatione valvata. Stamina 5; antheræ oblongæ. Discus subplanus, margine libero undulato. Ovarium 2-loculare. Styli 2, distincti, a basi filiformes; stigmata terminalia. Fructus ovatus, a latere compressus exalatusque v. transverse subteres ad commisuram longitudinaliter alatus, exocarpio membranaceo v. subcarnoso; pyrenæ a latere compressæ, præsertim ad commissuram induratæ ibidemque utrinque sulcatæ v. in loculos spurios vacuos productæ. Semen oblongum. Albumen æquabile.—Frutices Australienses, plus minus stellato-tomentosi v. lanati, foliis alternis petiolatis indivisis subtus tomentosis; stipulis nullis; umbellis paniculatis; bracteis parvis setaceis v. nullis.

A genus so closely allied to *Nothopanax*, that it can only be separated by artificial characters; so that the latter, bearing the more recent name, may have to be merged into it. In 1863 I transferred it (Journ. of Bot. i. p. 280) from *Umbelliferæ*, where up to that time it had been placed, to *Hederaceæ*,—a view since adopted by various authors.

1. *A. pterocarpa*, Benth. Fl. Austr. iii. p. 379.—Queensland, at Fitzroy Island (Walter Hill!).

2. *A. floccosa*, De Cand. Mem. Ombell. 30. t. 5; Prodr. iv. p. 75; Benth. Fl. Austr. iii. p. 379.—*Bolax floccipes*, Sieb. Pl. Exs. n. 258.—Queensland and New South Wales, Australia (R. Brown! Sieber! n. 258, A. Cunningham!).

Var. *α. subpeltata*, Benth. l. c.

Var. *β. angustifolia*, Benth. l. c.

Var. *γ. incana*, Benth. l. c.—*A. latifolia*, Benth. in Hügel, Enum. 55.

3. *A. longifolia*, Benth. in Hügel, Enum. 55; Fl. Austr. iii. p. 380.—Queensland and New South Wales (A. Cunningham! F. Mueller! R. Brown! M'Arthur!).

4. *A. ledifolia*, De Cand. Mem. Omb. 30. t. 6; Prodr. iv. p. 74; Benth. Fl. Austr. iii. p. 380.—*A. hoveoides*, A. Cunn.; Benth. in Hügel, Enum. 55. *A. linearis*, A. Cunn.; Benth. l. c. *γ. asperifolia*, F. Muell.; Klatt in Linnæa, xxix. p. 709. *Bolax ledifolius*, Sieb. Plant. Exs. n. 25.—New South Wales and Victoria (Sieber! n. 257, A. Cunningham! F. Mueller!).

Systematic Arrangement of the Hederaceæ.

Tribus I. Cussonieæ.—Stamina petalorum numero æqualia. Ovarium 2-(per excessum 3-)merum. Albumen ruminatum.

* *Pedicelli articulati.*

Sciadopanax, Seem.

Macropanax, Miq.

** *Pedicelli inarticulati.*

Brassaiopsis, Dcne. et Planch.

Cussonia, Thunb.

Sphærodendron, Seem.

Heteropanax, Seem.

Tribus II. Horsfieldieæ.—Stamina petalorum numero æqualia. Ovarium 2-(per excessum 3-)merum. Albumen æquabile.

* *Pedicelli articulati.*

Nothopanax, Miq., Seem.

Astrotricha, De Cand.

** *Pedicelli inarticulati*

Acanthopanax, Seem.

Didymopanax, Dcne. et Planch.

Tetrapanax, C. Koch.
Hydrocotyle, Linn. (ex parte).
Horsfieldia, Blume (*Echinopanax*, Dcne. et Planch.).
Crithmum, Linn.
? *Dipanax*, Seem.

Tribus III. HEDEREÆ.—Stamina petalorum numero æqualia. Ovarium 5-(abortu 3-)∞-merum. Albumen ruminatum.

* *Pedicelli articulati.*

Kissodendron, Seem. (*Irvingia*, F. Muell.).
Maralia, P. Thouars (*Oligoscias*, Seem.).

** *Pedicelli inarticulati.*

Oreopanax, Dcne. et Planch.
Hedera, Linn.

Tribus IV. PSEUDOPANACEÆ.—Stamina petalorum numero æqualia. Ovarium 5-(abortu 3-)∞-merum. Albumen æquabile.

* *Pedicelli articulati.*

Polyscias, Forst. (*Eupteron*, Miq.).
Grotefendia, Seem. (*Botryopanax*, Miq.).
Pseudopanax, C. Koch.
Cheirodendron, Nutt., Seem.
Eleutherococcus, Maxim.

** *Pedicelli inarticulati.*

Osmoxylon, Miq.
Heptapleurum, Gærtn. (*Paratropia*, De Cand.).
Brassaia, Endl.
Raukaua, Seem.
Trevesia, Vis.
Reynoldsia, A. Gray.
Gastonia, Comm.
Agalma, Miq.
Schefflera, Forst.
Sciadophyllum, P. Browne (*Actinophyllum*, R. et Pav.).
Gilibertia, R. et Pav.
Dendropanax, Dcne. et Planch.
Fatsia, Dcne. et Planch.

Tribus V. Plerandreæ.—Stamina 2–∞-plo petalorum numero. Ovarium 5–∞-merum.

Tupidanthus, Hook. f. et Thoms.
Tetraplasandra, A. Gray.
Plerandra, A. Gray.
Bakeria, Seem.
Nesopanax, Seem.
Triplasandra, Seem.

ON THE ECONOMICAL VALUE AND APPLICATIONS OF THE FOREST-TREES OF NEW ZEALAND AND THEIR PRODUCTS.*

By W. Lauder Lindsay, M.D., F.R.S.E., F.L.S.

Had the New Zealand Exhibition of 1865 been productive of no other good result, it has, at least, served to bring more prominently into notice the value of the New Zealand timbers, not only in themselves, but in comparison with those of the neighbouring colonies (Tasmania and Australia) and of Europe and North America. Mr. Balfour, C.E., conducted an admirable local series of experiments, in connection with the said Exhibition, and he has published an excellent resultant report on the strength and uses of the New Zealand timbers.† His tables give minute details regarding weight of a cubic foot; elasticity; greatest deflection with unimpaired elasticity; greatest weight carried with unimpaired elasticity; deflection at the instant of fracture: and other points, which are of importance to the engineer.

The following table, which shows only the specific gravity, and ultimate strength in pounds,‡ is compiled from Balfour's tables (p. 492).

	Sp. gr.	Ultimate strength in lbs.
I. Miscellaneous Foreign Timbers.		
Ironwood of Jamaica (*Erythroxylon areolatum*, Nat. Ord. *Erythroxylaceæ*), strongest wood tested in Paris in 1855	·987	468

* Referring chiefly to the trees of Otago and the South Island.
† Jurors' Reports of the Exhibition: 1866, p. 459.
‡ Representing the *mean results* of numerous carefully conducted and frequently repeated experiments.

	Sp. gr.	Ultimate strength in lbs.
Black-heart Ebony, Jamaica (*Brya Ebenus*, N. O. *Fabaceæ*)	1·193	424
Bitter Wood, Jamaica (*Quassia excelsa*, N. O. *Simarubaceæ*)	·555	117
Cedar, Jamaica (*Cedrela odorata*, N. O. *Cedrelaceæ*)	·576	99
Yacca, Jamaica (*Podocarpus Yacca*, N. O. *Coniferæ*)	·626	68

II. European Timbers.

British Oak	·752 ·898	128 178
„ Ash	·741	169
„ Beech	·696	129
„ Elm	·549	87
Russian Deal—Memel	·590	144
„ Fir—Riga	·745	89

III. Tasmanian Timbers.

Blue Gum (*Eucalyptus globulus*, Lab., N.O. *Myrtaceæ*)	1·035 1·061	196 260
Ironwood (*Notelaria ligustrina*, Vent., N. O. *Oleaceæ*)	1·043	260
Prickly Box (*Bursaria spinosa*, Car., var. N. O. *Pittosporeæ*)	·922	237
Black Wood (*Acacia melanoxylon*, Br., N.O. *Leguminosæ*)	·752	232
Stringy Bark (*Eucalyptus gigantea*)	·973	205
Pink Wood (*Beyeria viscosa*, N. O. *Euphorbiaceæ*)	·704	195
Native Box (*Bursaria spinosa*)	·871	189
Native Laurel (*Anopterus glandulosus*, N. O. *Escallonieæ*)	·750	140
Huon Pine (*Dacrydium Franklinii*, N. O. *Coniferæ*)	·536	137

	Sp. gr.	Ultimate strength in lbs.
Native Myrtle (*Fagus Cunninghamii*, N. O. *Cupuliferæ*)	·862	81
IV. Australian Timbers (N. S. Wales).		
Illawarra Box (*Eucalyptus* sp.)	1·170	432
Iron Bark (*E.* sp.)	1·138	282
Native Mahogany (*E.* sp.)	1·037	262
Black Butt (*E. media*)	·929	253
Forest Oak (*Casuarina suberosa*, N. O. *Casuarinaceæ*)	1·098	243
Blue Gum (*Eucalyptus* sp.)	·973	214
Spotted Gum (*E. goniocalyx*)	1·036	201
Stringy Bark (*E.* sp.)	·933	171
Mountain Pine (*Araucaria Cunninghamii*, N. O. *Coniferæ*)	·703	154
Cedar (*Cedrela* sp., N. O. *Cedrelaceæ*)	·458	120
V. Timbers of North Island of New Zealand.		
Black Maire (*Eugenia Maire*, A. Cunn., var., N. O. *Myrtaceæ*)	1·159	314
Titoki (*Alectryon excelsum*, De Cand., N. O. *Sapindaceæ*)	·916	248
Tawa (*Nesodaphne Tawa*, Hook. f., N. O. *Laurineæ*)	·761	205
Maire (*Eugenia Maire*, A. Cunn.)	·790	179
Kauri (*Dammara australis*, Lamb., N. O. *Coniferæ*)	·623 ·638	130 165
Rewa-rewa (*Knightia excelsa*, Br., N. O. *Proteaceæ*)	·785	161
Mangi (*Tetranthera calicaris*, Hook. f., N. O. *Laurineæ*)	·621	137
Kawaka (*Libocedrus Doniana*, Endl., N. O. *Coniferæ*)	·637	120
Kohe-kohe (*Dysoxylon spectabile*, Hook. f., N. O. *Meliaceæ*)	·678	117
Taraire (*Nesodaphne Taraire*, Hook. f.)	·888	112

	Sp. gr.	Ultimate strength in lbs.
Whau (*Entelea arborescens*, Br., N. O. *Tiliaceæ*)	·189	32

VI. Otago Timbers.

Black Mapau * (*Pittosporum tenuifolium*, Banks and Sol.)	·965	243
Manuka (*Leptospermum ericoides*, A. Rich.)	·943	239
Kowai (*Sophora tetraptera*, Aiton, var. *grandiflora*, Salisb.)	·884	207
Black Birch (*Fagus fusca*, Hook. f.)	·780	202
Miro (*Podocarpus spicata*, Br.)	·787	197
Rata (*Metrosideros lucida*, Menzies)	1·045	196
Red Mapau (*Myrsine Urvillei*, A. De Cand.)	·991	192
Matai (*Podocarpus ferruginea*, Don)	·658	190
White Mapau (*Carpodetus serratus*, Forst., N. O. *Saxifrageæ*)	·822	177
Red Birch (*Fagus Menziesii*, Hook. f.)	·626	158
Rimu (*Dacrydium cupressinum*, Soland.)	·563	140
Totara (*Podocarpus Totara*, A. Cunn.)	·559 ·630	122 133
Hinau (*Elæocarpus dentatus*, Vahl, N. O. *Tiliaceæ*)	·562	125
Moko (*Aristotelia racemosa*, Hook. f., N. O. *Tiliaceæ*)	·593	122
White Pine (*Podocarpus dacrydioides*, A. Rich.)	·488	106

Analysing the foregoing table—and classifying the woods therein mentioned, according to their ultimate strength, by a scale rising 50 lbs. in each group—it appears that none of the Otago timbers belong to the higher groups (over 400 lbs.), which, however, include only a few trees, whose wood is little known in commerce or the arts, viz. Jamaica Ironwood, Black-heart Ebony, and Illawarra Box. Of the next group (over 300 lbs.), there is only one representative,—a New Zealand wood, however,—the North Island Black Maire. The third group (over 250 lbs.) is more largely represented, only, however, by

* The names (both Maori and scientific) here used are those employed by Balfour in his tables.

Tasmanian and Australian woods, viz. Tasmanian Blue Gum and Ironwood: and Australian Ironbark, Native Mahogany, and Black Butt. The fourth group (over 200 lbs.) includes several Otago timbers, viz. Black Mapau, Manuka, Kowai, and Black Birch, in common with a few Tasmanian (*e. g.* Prickly Box, Black Wood, and Stringy Bark) and Australian woods (*e. g.* Forest Oak, Blue and Spotted Gum). The best of the British timbers fall into the next group (over 150 lbs.), viz. Ash and Oak, as well as some of the most esteemed North Island timbers of New Zealand (Kauri, Maire, and Rewa-rewa), and several Otago woods (Miro, Rata, Red Mapau, Matai, White Mapau, and Red Birch), in common with some Australian (Stringy Bark and Mountain Pine) and Tasmanian woods (Pink Wood, Native Box, and Native Myrtle). The sixth group (over 100 lbs.) includes the remainder of the Otago woods, and some of those which are most highly esteemed and most extensively used, viz. Rimu, Totara, Hinau, Moko, and White Pine; along with several North Island timbers (Mangi, Kawaka, Kohe-kohe, and Taraire); a few Australian and Tasmanian woods (Native Laurel, Huon Pine, and Cedar); with British Beech and Memel Deal. None of the New Zealand or Australian and Tasmanian timbers belong to the lower groups (under 100 lbs.), a category, however, which includes British Elm and Riga Fir, as well as Jamaica Cedar and Yacca. It thus appears, that while the Otago timbers rank as to ultimate strength below certain of those of Jamaica, Australia, Tasmania, and the North Island (New Zealand), they take a superior place to those of Northern Europe (including Britain and Russia), and rank equally with some of the most useful woods of the neighbouring colonies. It is obvious, however, from such a table and its deductions, that any single character, such as ultimate strength, is not a sufficient criterion of the utility of a timber or wood; for we find ranking in inferior groups the important and much-used Baltic Deal among British timbers; the Rimu, Totara, and Red Birch of Otago; the Kauri and Maire of the North Island, New Zealand; the Stringy Bark of Australia; and the Huon Pine of Tasmania.

From such a table, however, we might properly infer that the Otago timbers ought to take a high place among woods adapted for all the ordinary arts of construction; and the exhibits at Dunedin in 1862 and 1865 prove unmistakably that they may be applied with advantage to all the uses which, in Britain, are subserved by the Pines or

Firs of Scandinavia, the Baltic, or North America; our own Oak, Ash, Elm, Birch, and Beech; or Mahogany, Walnut, Rosewood, and other ornamental woods. Among the very various purposes to which Otago timber has already been applied, may be mentioned ship- and boat-building; the construction of jetties, wharves, and bridges; of houses, —including shingle for roofing,—of churches, and other public edifices of every class; the manufacture of furniture and cabinet-work, plain and ornamental; of implements used in agriculture, joinery, or carpentry, in turnery and cooper work, in block-cutting for paper- and calico-printing, or wood-engraving; in fencing, and as firewood. The Otago timber-trees supply excellent material for ship-building, which is carried on chiefly on the inlets of the south-eastern and southern coasts, and on the fjords of Stewart's Island. In Otago, and, apparently, in the South Island generally, Totara and Red Pine are the material chiefly used for knees and timbers, deck- and side-planking. The Red and Black Pine, which abound in the forests of Stewart's Island, furnish the best class of ship-building timber. In the New Zealand Exhibition of 1865, Dunedin-made yachts, boats, and naval models of Otago timber were shown (No. 608).

Some of the Otago timbers have a high reputation also for their *durability* when exposed to fresh or salt water, and for their resistance to the destructive action of marine boring-animals; though it has yet to be determined how far this reputation is well-founded. For durability in water, or in moist situations, the woods most generally esteemed at present are Manuka, Totara, Black Birch, Black Pine, and Red Mapau.

Ornamental woods are as abundant in Otago as in the more northerly parts of New Zealand. They afford great scope for the application of the decorative arts (design, carving, inlaying) to the higher departments of cabinet-work. The New Zealand Exhibition contained numerous admirable specimens of inlaid work, showing great variety of colour. In point of beauty of material, furniture, made of Otago—and, generally, of New Zealand—woods, competed favourably with that made from the finest ornamental woods of other and older countries. Indeed, nothing can surpass some of the woods in question in beauty.*

* Jurors' Reports, New Zealand Exhibition, 1865, p. 285 (Report on Furniture).

For ordinary cabinet-work—in the construction of household furniture of the commoner kinds—the woods chiefly used appear to be Rimu, Black Pine, Rata, and Black Mapau, though Totara and Matai are also employed. In the Industrial Exhibition at Dunedin in 1862, were displayed polished slabs, suitable for ordinary and ornamental cabinet-work, of—

Totara.
White Pine.
Black Pine.
Rimu.
Manuka.
Goai.
Broad-leaf.
Red Mapau.
Cabbage-tree.
Moka.
Pepper-tree.
Cedar.
Tree Tutu.
Tooth-leaved Aster.
Aki-aki.

The timber-exhibits at Dunedin in 1865 included,*—

Totara.
Black Pine.
White Pine.
Red Pine.
Manuka.
Birch.
Matai.
Broad-leaf.
Ironwood.
Miro.
Kowhai.
White Mapau.
Mikamik.

As the result of an elaborate experimental inquiry on the comparative value of New Zealand timbers, and on their most suitable applications, Balfour recommends the more extensive use for general purposes of the following Otago woods :—

Manuka (*Leptospermum ericoides*).
Kowhai (*Sophora tetraptera*, var. *grandiflora*).
Black Birch (*Fagus fusca*).
Red Birch (*F. Menziesii*).
Red Pine.
Black Pine (*Podocarpus ferruginea*).
Totara.
Rata (*Metrosideros lucida*).

* Jurors' Reports—Exhibits of James M. Balfour, C.E., p. 134.

And I have little doubt the next New Zealand Exhibition will prove, not only that his recommendations have been adopted, but that the economical applications of the Otago timbers and barks have been greatly multiplied or extended in the construction of colonial furniture and otherwise.

The applications of the Otago timbers in the arts of construction, do not, however, represent all the uses to which the bark or wood of Otago trees may be applied; though the following subsidiary applications in the other arts have not yet been developed to the same extent. In several Otago woods and barks there is a notable amount of Tannin or tannic acid; in some cases such an amount as to justify the hope they may yet become of service in colonial tanning, as a substitute for the astringent barks now imported from Australia or Europe. The following table (compiled from the Report on Tanning Materials by Mr. Skey in the Jurors' Reports of the New Zealand Exhibition, p. 427) exhibits, according to his analyses, the following percentage of Tannin in certain Otago trees or shrubs, as compared with what occurs in the chief European tanning barks:—

I. European Trees.

Oak Bark—varies according to age of tree when cut—from 6 to 22 per cent., average 14.

Willow	6·8	„
Elm	2·9	„
Birch	2·	„
Larch	1·6	„

II. North Island (New Zealand) trees.

Phyllocladus trichomanoides, Don, N. O. *Coniferæ*, 6·00 p. c.

III. Otago trees or shrubs.

*Coriaria ruscifolia** (leaves and roots) from 2·14 to 8·32		„
	average 4·45	„
Elæocarpus Hookerianus (Bark)	8·60	„
Fagus Solandri† (Bark)	2·60	„

* *Vide* my paper on "The Toot Plant and Poison of New Zealand," Brit. and For. Medico-Chirurgical Review, July, 1865, p. 172.

† The bark of Black Birch, which is abundant in the Upper Hutt valley and elsewhere in the vicinity of Wellington, is or has been used in Wellington for tanning, and it has been reported as superior to English Oak bark.

A lesser amount occurs in Manuka, Rata, Fuchsia, Red Mapau, and *Fagus Menziesii.*

Some Otago trees yield Dye-stuffs, one of which, at least, of Maori manufacture, has long enjoyed, equally among natives and settlers, a high reputation for brilliancy and permanence, viz. the "Hinau," the produce of *Elæocarpus dentatus* and *E. Hookerianus.* Strange to say, the skilled European colonist has hitherto failed to rival, in either brilliancy or permanence, the beautiful black dye produced by the simple and primitive processes of the Maori. Dye-stuffs and Ink are procurable from the Fuchsia and Tutu,* while *Phyllocladus alpinus,* Hook. f. (bark), like its more northern ally *P. trichomanoides,* yields a red dye. A few Otago shrubs or trees yield gums or gum-resins, *e.g.* Rimu, *Panax Colensoi,* and *Pittosporum tenuifolium;* others, or some of their products, are possessed of Medicinal properties, as aromatics, purgatives, stimulants, tonics, alteratives, or astringents, *e.g.* Manuka, Tutu,* Fuchsia, *Drimys axillaris, Panax simplex* and *Edgerleyi,* and *Cordyline australis;* a few have poisonous properties, *e.g.* Tutu;* while others yield articles of food, or beverages, useful to man in his savage or civilized state, or to cattle, *e.g. Cordyline australis* (sugar and alcohol), Manuka (leaves), *Fuchsia excorticata* (fruit), *Aristotelia racemosa* (fruit), *Coriaria ruscifolia* (fruit),* *Dacrydium cupressinum* (leaves), *Coprosma lucida* (fruit), *Panax Colensoi,* and *Melicytus ramiflorus* (leaves for cattle). And, lastly, a few Otago trees, especially Liliaceous and Malvaceous ones, possess fibrous bark or wood suitable, apparently, for certain purposes in the manufacture of textile fabrics, cordage, or paper, *e.g. Cordyline australis* and *C. indivisa, Plagianthus Lyallii* and *P. betulinus,* and *Hoheria populnea.*

THREE NEW CHINESE ASTERACEÆ.

By H. F. Hance, Ph.D.

1. *Blumea amethystina,* n. sp.; caulibus erectis angulatis striatis inferne pubentibus superne villosis, foliis oblongis acutis basi attenuatis a medio inæqualiter serratis rigide membranaceis utrinque asperrimis atque subtus pubescentibus, racemis subnudis vel parce foliatis sim-

* *Vide* my paper on "Toot" (*supra citat.*), p. 161

plicibus vel paniculatis interruptis, capitulis sessilibus 2–7 aggregatis circ. 3 lineas longis, involucri squamis flores æquantibus linearibus acutis exterioribus brevibus omnibus extus dense et pulcherrime amethystino-villosis intus glaberrimis nitidis, floribus fœm. numerosis hermaphroditis circ. 20, corollis luteis, achæniis nitidis parce pilosulis, pappo albo.—Ad fauces Shiu-hing, secus fl. West River, prov. Cantoniensis, Febr. 1866–7, collegit T. Sampson. (Exsicc. n. 12815.)

An exceedingly beautiful plant, remarkable for the brilliant amethyst-coloured involucres, the tint frequently extending to the whole pubescence on the inflorescence; all the specimens gathered in two successive years quite alike. Its relationship is with *B. hieracifolia*, De Cand., and its allies. This genus may, in Asia, be compared for intricacy to *Hieracium* in Europe. I feel persuaded that Mr. Bentham's ideas (Fl. Hongk. p. 78) of the instability of the majority of the species are erroneous, for many of the South Chinese forms appear to me quite constant, though certainly not easily characterized in words.

2. *Gnaphalium Amoyense*, n. sp.; sesquipedale, floccoso-album, caule erecto subsimplici, foliis confertis linearibus $1\frac{1}{2}$-pollicaribus lineam latis semi-amplexicaulis non decurrentibus apice mucronulo calvo castaneo apiculatis supra dense tomentosis subtus densissime albo-pannosis, corymbo composito terminali laxo corymbulis densiusculis, involucri squamis oblongo-linearibus apice obtusis sæpe eroso-denticulatis inferne testaceis lana alba obductis supra medium nitide citrinis.—In collibus circa Amoy, ipse legi, m. Octobri 1857. (Exsicc. n. 1420.)

I had taken this for the Japanese and Martaban *G. confusum*, De Cand., and sent it to friends under that name; Mr. Bentham, however, informed me of the error, and has since then, in the 'Flora Hongkongensis,' referred De Candolle's species as a synonym to *G. multiceps*, Wall., which, again, F. Mueller has recently (Fragm. Phyt. Austr. v. 150) reduced to *G. luteo-album*, Linn., which to me seems quite distinct. The Amoy plant, in Mr. Bentham's judgment, is closest to *G. hypoleucum*, De Cand.

3. *Senecio (Obæjacæ) exul*, n. sp.; glaberrimus, caule a basi decumbente erecto ramoso angulato striato-sulcato, foliis inferioribus petiolatis superioribus sessilibus oblongo-lanceolatis semiamplexicaulibus pinnatipartitis laciniis remotis dentatis, corymbo composito laxiusculo, involucri campanulati esphacelati phyllis lineari-subulatis acutis

brunneo-nervosis per totam longitudinem late hyalino-marginatis, calyculi squamis brevissimis acutis, floribus omnibus tubulosis, achæniis dense pubescentibus, pappo flosculum æquante.—In alluviis æstate inundatis fl. East River, prov. Cantoniensis, consociatis *Potentilla Amurensi*, Maxim., *Œnanthis* (*Dasylomatis*) specie, cæt., copiose vigentem invenit oculatissimus Sampson, d. 22 Febr. 1867. (Exsicc. n. 13827.)

This is extremely close—possibly too much so—to *S. Ægyptius*, Linn., from which, indeed, as compared with a specimen of Sieber, it seems to differ only by the eligulate florets, widely-transparent-margined involucre-scales, and very angular stem. It is an interesting *trouvaille*, as I believe no species of the group to which it belongs has been found before in any part of India or easternmost Asia.

ON TWO NEW CHINESE FERNS; WITH SOME REMARKS ON THE GENUS WOODWARDIA.

By H. F. Hance, Ph.D., etc.

1136b 1. *Alsophila Metteniana*, n. sp.; frondibus membranaceis, 2–3-pinnatis, pinnis lanceolatis, pinnulis e basi truncata oblongo-lanceolatis lucidis subtus pallidioribus inferioribus petiolatis ad medium usque in lobos obtusos pauci-serratos incisis mediis sessilibus minus profunde pinnatifidis summis in acumen pinnatifidum connexis inde basi inferiore in alulam rachin marginantem sensimque decrescentem decurrentibus, rachibus infra castaneis nitantibus supra ferrugineo-strigosis, costa venisque subtus strigillosis, venis simplicibus singulo segmento 2–3-jugis ad marginem excurrentibus inferioribus 1–2 medio soriferis, receptaculo incrassato paraphysibus plurimis elongatis soros superantibus persistentibus donato.—In prov. Fokien Sinarum, a. 1861, collegit cl. De Grijs.

This plant is so very like *A. gigantea*, Wall., that I had distributed it so labelled to various friends. My lamented correspondent the late Prof. Mettenius, to whose memory I have dedicated it, however, detected the error, remarking, in a note, "species indescripta, ab *A. gigantea* paraphysibus longissimis distinctissima." It is much nearer that species than *A. podophylla*, but the numerous and very long paraphyses, the decurrent wing-like bases of the upper pinnules,

gradually diminishing into a finally vanishing margin, and the fewer sori readily distinguish it; besides which, it does not dry of the same dark hue. I suppose, also, it may be close to *A. glabra*, Hassk. (not the *Gymnosphæra glabra* of Blume), which is apparently unknown to European pteridologists. I fear the late Sir William Hooker, to whom I several years since communicated a specimen, must have shared my mistake; for, though in the 'Species Filicum' he assigns to *A. gigantea* a "receptacle without hairs," I find no allusion to the Chinese plant in the 'Synopsis,' except that *A. gigantea* (which, following Moore, but contrary to the opinion of Mettenius, he reduces to *A. glabra*) is recorded as a native of China.

2. *Woodwardia angustiloba*, n. sp.; stipitibus validis stramineo-brunneis lucidis concolori-paleaceis, frondibus amplis rigide coriaceis pinnatis, pinnis subpetiolatis lanceolatis 6–8 poll. longis pinnatisectis $2\frac{1}{2}$ poll. inter se remotis, pinnulis linearibus falcatis acuminatis basalibus inferioribus 3–4 abortientibus supremis in apicem pinnatifidum confluentibus margine cartilagineo revoluto obsolete serrulato 2–$3\frac{1}{2}$-pollicaribus $2\frac{1}{2}$–3 lin. latis sinu iis æquilato vel etiam latiore sejunctis basi decurrente marginem angustum (vix linealem) secus rachin efficientibus subtus secus costam basinque versus conspicue paleaceis, venis extra soros semel bisve anastomosantibus in pagina inferiore elevatis, soris costæ approximatis ultra 20-jugis immersis costam pinnæ primariam non raro attingentibns, indusiis fornicatis brunneis cum margine elevato fossulæ soriferæ coriaceis.—Prope urbem Foochow, Maio 1857, coll. Guil. Gregory.

This remarkable Fern, of which I only possess a single specimen, and that wanting the base of the stipes and apex of the frond, is, no doubt, closely allied to *W. radicans*, Sm., and *W. orientalis*, Sw. It has, however, so totally different an aspect, caused by the copious paleæ on the under surface, and the narrow, linear, distant pinnules or segments, separate almost to the base and there decurrent, that I cannot believe it to be a variety of either, supposing them to be distinct.

The sections into which it has been proposed to divide this genus appear to me quite untenable. Thus, it is not invariably the case that the veins of *W. orientalis* anastomose copiously outside the sori. I have now before a specimen,—proliferous as represented by Hooker,*—in which many of the pinnules have all the veins entirely free, whilst

* Bot. Beechey's Voyage, t. 56.

others have one or two reticulations. On the other hand, *W. Japonica*, Sw., is equally variable in venation. I have a specimen precisely similar to Thunberg's plate,* in which there is frequently an areole external to the sori, and I find the same to be the case in Dr. Harland's Sung-tong specimens, quoted by Hooker under this species,† whilst the finest Chinese and Nagasaki specimens I have seen have perfectly free venation. As to the section *Lorinseria*, there is nothing but the so-called dimorphism of the fronds to distinguish it. But this term is not here strictly applicable. There is no dimorphism, properly speaking, in *W. Harlandii*, Hook.; and Sir W. Hooker has himself‡ figured one of the simple fronds of this species as soriferous: it may be described as *heterophyllous*, but not as *heteromorphous*, in the sense in which that term is applied by Fée and others to Ferns. And, if the plate of Schkuhr,§ usually so remarkable for his accuracy, be taken as a correct representation of *W. angustifolia*, Sm., I do not see that that species is any more entitled to be so described. It is true that the soriferous fronds are usually narrower than those which remain sterile, just as happens with *Pteris Cretica*, L., *P. crenata*, L., *P. pellucida*, Presl, and their allies; but this commonly occurs in Ferns, and is apparently due to the action of that compensating law by which, in phanerogams, luxuriant-foliaged specimens are bad flowerers, both fruits and seeds being maintained, as Lindley observes,‖ at the expense of the leaves. True dimorphism—such as is met with in *Polypodium quercifolium*, L., *P. Fortunei*, Kze., etc.—is very different; though the small value even of this is conclusively shown by *P. coronans*, Wall., so close an ally of the former.

Nor do I see how *Doodya* (already united to *Woodwardia* by Mettenius,** Fée,†† and Moore,‡‡ but distinguished by Hooker§§ as having "a natural habit and tangible characters") can be separated generically. There is absolutely no discriminative character except the superficial sori; those who admit the value of this should logically exclude *Polypodium papillosum*, Bl., and *P. verrucosum*, Wall.,—not very near allies,—from *Polypodia* proper. As to habit, I see nothing distinctive in the genus; and, considering how the allied genera vary

* Fl. Japon. t. 35.
† Spec. Filic. iii. 69.
‡ Fil. Exot. t. 7.
§ Farrenkr. t. 111.
‖ 'Theory of Horticulture,' ed. 1, par. 105.
** Fil. Hort. Lips. 65.
†† Gen. Fil. 206.
‡‡ Index Fil. 342.
§§ Op. cit. iii. 71.

in this respect, it seems impossible to doubt that this is a very trivial difference. It is singular that while Presl* places *W. Virginica* in *Doodya*, and Fée in his equivalent section of *Woodwardia*, Mettenius† and Hooker locate it with the typical *Woodwardiæ*. It is indeed so exceedingly like *W. Japonica* (the supposed diagnostic character given by Mr. Baker,‡ derived from the more or less prolonged costal sori, does not hold good), that I should not be at all surprised at their proving conspecific.

LADIES'-BEDSTRAW AND HARRIFF.

The following correspondence has been published in the 'Athenæum':—

"*Bedstraw.*—Is there any authority for saying that the name of this plant was ever spelt *Bede* or *Bead-straw?* In Dodonæus's 'Herbal,' translated by Henry Lyte, with additions, fol. 1578, it is said, 'This Herbe is called—in Douch Walstroo; and as Matthiolus and Turner write Unser Frauwen Wegstro (Our Ladies Way-strew) and of some Megerkraut; we may also name it Pety Muguet, Cheese (rennet), or our Ladies Bedstraw.' (Page 539) Minshew (Ductor in Linguas, 1617) has 'Ladies Bedstraw, because their beds were strawed with it.' But probably, like many other pretty things, it was dedicated to 'our Lady;' and those only who have seen the delicate white Bedstraw on our downs, covering the sward with a smooth white sheet, can appreciate the truthfulness and beauty of the name which designates it a fit strewing either for the path, as in Germany, or the bed of the queen of the fairies, or her successor 'our Lady.' It is a pity to try to knock the poetry out of old words by giving them prosaic derivations. It is not safe either to jump to conclusions from similarity of sound."

"*Harriff* is not 'hair-rough;' but the Irish word for cleevers (see Withering, 'Botany,' ii. p. 227), probably imported by Irish harvestmen."—EDEN WARWICK.

"There is a Lincolnshire legend about the yellow Ladies'-Bedstraw, which shows that people in former days believed that this plant owed its name to the Blessed Virgin. The story is, that when the infant

* Tentamen Pteridograph. 99. † Fil. Hort. Bot. Lips. 65.
‡ Synops. Fil. 188.

Jesus was born, his mother lay upon the cattle-bedding in the stable, which was composed of Bracken and Bedstraw. The latter plant, to do honour to the Mother of God and her babe, at once burst into flower, and, as a mark of the divine favour, the blossoms, which had heretofore been white, were made golden. The Bracken (*Pteris aquilina*) before this time had borne flowers like other herbs; but it refused on this occasion to show respect to the mother-maid and her infant by sulkily withholding its blossoms. As a punishment for this obstinacy, it has never been permitted to bear flowers since.

"Mr. Warwick is, I believe mistaken in thinking that *hariff* is a corruption of an Irish word. It is the common name for Cleeven or Catchweed throughout the greater part of the North of England. The oldest Lincolnshire peasant knows no other name by which to indicate this pestilent weed. Irish labourers have not been in the habit of coming into this part of England for more than about forty years. They have had no perceptible influence on our dialect. It is not probable that they should not only have given us a new name for a common plant, but that the older name should be entirely forgotten."—EDWARD PEACOCK.

"Twice at least I have met with Bedstraw spelt 'bedestrawe' in old books on plants—once, in a black-letter volume on 'Souveraigne Herbes.' After the time of Gerarde, the plant was spelt 'Bedstraw,' and though the 'e' sometimes creeps in, it is obviously an error. Let me add another fact. The Ladies'-Bedstraw is subject to a peculiar disease which produces on leaves and stems a number of purplish *beads*, the size of a small pea, but hollow within. I have frequently noticed Irish children 'telling their beads' whilst playing with the long straws and the whorled leaflets. The plant possesses many virtues. It is used to coagulate milk for the 'soft cheeses' of the Midlands. Its leaves give a yellow, and its roots a red dye, when boiled with alum. An allied plant, the 'Sweet Woodruff' (*Asperula odorata*), was undoubtedly strewed in churches, and from its sweet, hay-like scent, when dried, would form an appropriate 'litere' for bedrooms, or stuffing for beds. None of the Bedstraws would be suitable for this purpose."

"'Hairriff red' (spelt 'Erriff' occasionally) is a remedy at least two hundred years old for the purifying of the blood, under the name of decoction. I am well acquainted with Irish wild-flowers, particularly with those growing in the Gaelic-speaking districts of Munster, and I

never heard the there somewhat rare Cleavers called hairriff, or any similar sounding word; nor have I been able to learn that it is so. If the name appears in the recently-published valuable book on the Flora of Ireland, the matter may admit of a different explanation."—J. T. Burgess.

"*Hariff* is another very characteristic Anglo-Saxon word, rubbed down somewhat by the attrition of centuries. Its original form is 'hegerife,' from 'hege,' a hedge, and (perhaps) 'reafian,' to seize, lay hold of. Bosworth translates it 'Haireve, *clavers, broad-leaved burweed.*' In the 'Promptorium Parvulorum' it appears under the form 'hayryf,' and it still survives in Northamptonshire and other parts of England for the *Galium Aparine*, common Cleavers, or Goosegrass, though Mr. Prior is of opinion that it originally signified the *Arctium Lappa*, or Burdock. 'Hariff' does not occur in my friend Mr. A. G. More's admirable 'Cybele Hibernica.' As a genuine Saxon word, it is probably unknown in Ireland."—E. V.

"I am exceedingly interested with the statement of Mr. Burgess that Woodruff 'was undoubtedly strewed in churches,' and should be very greatly obliged if he could give me references to any individual instances, either from contemporary or other records."—J. Fowler.

ON THE FIRST LEAFING AND FLOWERING OF PLANTS FOUND IN THE NEIGHBOURHOOD OF MARLBOROUGH.

By the Rev. T. A. Preston.

In the accompanying list, the dates, unless mentioned to the contrary, are those on which the first flowers were observed. "By" is prefixed when the plant appeared to have been in flower a day or two; an asterisk indicates that the specimen observed was a cultivated one.

The mild winter allowed several plants to survive, and, consequently, such plants as *Cerastium glomeratum*, *Ulex Europæus*, *Senecio vulgaris*. *Vinca minor*, *Veronica polita*, *V. agrestis*, *Lamium purpureum* and *L. album*, were in flower very early in the year.

The following are the initials of the observers:—

A.—M. O. Alison.
B.—Rev. H. E. Booth.
D.—J. W. Dudding.
H. D.—H. Grant-Dalton.

E.—H. A. Evans.
G.—R. M. B. Glasse.
H.—H. M. Hilton.
I.—S. Image.
L.—J. A. Lefroy.
P.—Rev. T. A. Preston.
E. S. P.—E. S. Preston.
R. P.—R. Phayre.
R.—B. W. Repton.
S.—F. Storr, Esq.
T.—E. F. im Thurn.
E. J. T.—E. J. Turner, Esq.
T. T.—T. Tilleard.
W.—W. Willimott.

Ranunculus Ficaria. Feb. 15. H.
Cardamine hirsuta. Feb. 13. T.
Viola odorata. By March 1. A.
Stellaria media. Feb. 13. T. (probably earlier).
Adoxa Moschatellina. Feb. 27. T.
Petasites vulgaris. Feb. 28. T. T.
Tussilago Farfara. Feb. 21. H.
Veronica hederifolia. Feb. 13. T.
*Daphne Mezereum. Feb. 12. P.
*D. Laureola. By Feb. 21. P.
Mercurialis perennis. (Barren) Feb. 26. T. (Fertile) March 9. T.
Ulmus suberosa. (Full bud) Feb. 16. T.
U. montana. Feb. 27. Mrs. Blake.
Salix Caprea. (Barren) Feb. 28†. L. (Fertile) March 2. T.
Corylus Avellana. (Male, full flower) Feb. 13. R. P. (Fertile) Feb. 13. G.
Taxus baccata. Feb. 26. T.
Narcissus Pseudo-narcissus. By Feb. 26. A.
Galanthus nivalis. (Wild) Feb. 16. T.
Anemone nemorosa. March 2. H. D.
*A. apennina. March 14. B.
Ranunculus auricomus. March 29. E. S. P.
Caltha palustris. March 23. T.
Helleborus viridis. March 4. A.
*Berberis fascicularis. March 13. E. J. T.
*Corydalis solida. March 14. T.
Cardamine pratensis. March 31. E. S. P.
Arabis hirsuta. March 14. S.
Draba verna. By March 14. T. and S.
Capsella Bursa-pastoris. March 14. S.
Viola hirta. March 15. T.
V. Reichenbachiana. By March 30. H.
V. Riviniana. March 28. E.
V. tricolor. March 4. I.
Arenaria serpyllifolia. March 14. S.
*Æsculus Hippocastanum. (Bud bursting) March 17; (flower-buds) March 26. D.
Trifolium minus. March 14. T.
Prunus spinosa. March 29. R.
Potentilla Fragariastrum. March 2. T.
*Montia fontana. March 21. T.
*Ribes Grossularia. March 15. T.
*R. rubrum. March 22. D.
*R. sanguineum. March 13. T.
Saxifraga tridactylites. Mar. 14. P.
Anthriscus sylvestris. March 11 and 30. T.
Fraxinus excelsior. About March 24. P.
*Pulmonaria officinalis. March 6. P.
Lathrea squamaria. (Bud) March 21. W.
*Scrophularia vernalis. March 18. T.
Nepeta Glechoma. March 14. T.
Primula veris. (Full bud) March 28. E. J. T. and S.
Plantago lanceolata. (Full bud) March 22. T.
*Asarum Europæum. March 14. P.

† A specimen, half out, but damaged by frost, was found on Feb. 23. D.

Buxus sempervirens. March 14. T.
Carpinus Betulus. March 27. T.
*Larix Europæa. (Fertile) March 13. E. J. T. (Male) March 23. E. J. T. and S.
Tulipa sylvestris. March 30. A.
Luzula pilosa. March 16. H.
Poa annua. March 25. T.

MIMICRY IN NATURE.

We have heard lately much about "Mimicry in Nature," where certain features of one species reappear in another not in any way related to it, as, for instance, in the Pineapple, where the fruit bears a striking external resemblance to a Pine-cone; certain spiny Euphorbias, where the stem has the look predominating in the Cactus tribe, or in the iron or beef-woods (*Casuarinas*), where the branches are singularly like our Horsetails, or Equisetums. On the Nicaraguan rivers I met several curious instances of this, viz. some plants belonging to what Humboldt has aptly termed the Willow form. There were genuine Willows, which the country-people termed "Sauce," the fresh green of which afforded a pleasing relief to the eye after gazing so long on dried-up or leafless vegetation; but with them grew not only the feathery Bamboo, and the beautiful *Lindenia rivalis* (both good instances of the Willow form), but also a yellow-flowering Bignoniacea (*Astianthus longifolius*, D. Don), often forty feet high, and a tall *Composita*, both known by the Quichuan name of "Chilca," which, unaffected by the periodical rising of the water and the turbulence of the stream, not only had the same foliage, habit, and mode of growth as genuine Willows have, but served the same purposes in nature's economy, by protecting and keeping together the river banks. In the Viti Islands I observed similar instances of the predominance of the Willow form on rivers (*Lindenia Vitiensis*, *Acalypha rivularis*, *Ficus bambusæfolia*, two species of Bamboos, etc.). The question then as now presented itself —what possible connection can there be between the two? Do these plants grow on rivers because they have Willow-leaves, or do they have Willow-leaves because they grow on rivers? This is, in fact, the old question over again—Does the duck swim because it has webbed feet, or has it webbed feet because it swims?—'*Dottings on the Road-side*,' *B. Seemann, p.* 46.

THE DARWINIAN THEORY.

Mr. Darwin's system is provided with two origins of species, the first is the primordial form, the parent of all forms, in itself "very simple" and of very low organization, which was created and divinely endowed with life. Of this we hear no more after it has been once mentioned; for the second form, or the first variety, was not created, but was the production of natural selection. To this we shall return after discussing the more important and, we may say, the *real* origin of species in this theory, as the primordial form is of no use to the general plan, and mars the grand principle on which the whole has been constructed.

The real origin, then, of species in the Darwinian system is an imaginary progenitor of each grand class, whether it be an order or a genus, for that is not very clearly stated; at any rate, however, it is supposed that each very distinct genus had a peculiar progenitor, not capable of description, but somehow or other uniting in itself the chief peculiarities discernible in all species that have descended from it. Mr. Darwin mentions the progenitor of the genus *Equus*, and of the bat, and also of the bustard and ostrich, and alludes to a common ancestor of the horse and tapirs; but, above all these and before them all, there was also a common progenitor of all vertebrated animals, some creatures unlike any known animal, and possessing more vertebræ than any of its descendants. This animal must of course have been the progenitor of all the other progenitors of the different vertebrated genera, but this is mentioned only once in the theory.

Thus is the doctrine stated in general terms:—

"The points in which all the species of a genus resemble each other, and in which they differ from the species of some other genus, are called generic characters; and these characters in common *I attribute to inheritance from a common progenitor*, for it can rarely have happened that natural selection will have modified several species fitted to more or less widely different habits in exactly the same manner, and as these so-called generic characters have been inherited from a remote period, *since the period when the species first branched off from their common progenitor*, and subsequently has not varied or come to differ in any degree, or only in a slight degree, it is not probable that they should vary at the present day. On the other hand, the points

in which species differ from other species of the same genus are called specific characters, and as these specific characters have varied and come to differ within the period of the branching off of the species from a common progenitor, it is probable that they should still often be in some degree variable,—at least more variable than those parts of the organization which have for a very long period remained constant" (pp. 183–4).

In this statement the imagination has been very active, and several propositions are advanced as unquestioned facts which require yet to be proved, though we may add that the proof which we have a right to demand it would be impossible to furnish. We first hear of a common progenitor of a genus,—let us suppose of the *Felidæ*,—that is, there was once a common progenitor of the lion, tiger, panther, puma, leopard, ocelot, cat, etc.; all the species are supposed to have branched off from this common progenitor, and to have become distinct species by the process of natural selection; they are like one another in generic distinctions, but unlike in specific distinctions. The generic character has been much more ancient than the specific, and *therefore* will probably not change any more; the specific character, being a more modern affair, may be, and probably will be, more variable,—"at least more variable than those parts of the organization which have for a very long period remained constant."

Thus we are to look at an animal as having a body composed of parts of different ages; for instance, a lion is in general character like the other *Felidæ*, but unlike them in his mane and the tuft at the end of his tail; so his claws, common to the genus, may be a hundred thousand or perhaps a million years or ages older than his mane; his mane and his tail may be more variable, and probably will be, whilst the rest of his body, which is of the generic category, will remain stationary.

That Mr. Darwin really means all this is quite certain; for he gravely informs us that the wing of a bat is a very ancient part of its body, and, owing to its antiquity, will probably not be changed any more. "In the case of the wing of the bat, which has been transmitted in the same condition *to many modified descendants*, it must have existed according to my theory for an immense period in the same state, and thus it comes to be no more variable than any other structure" (p. 181).

By this statement we may perhaps conjecture that the progenitor of the bats had wings, for these appendages have been "transmitted to many descendants," but if so we should inquire whence the progenitor acquired his wings? this is the great question in this aspect of the origin of species, and of this we shall have more to say presently.

What Mr. Darwin may mean by a bat's wing being "no more variable *than any other structure*," we cannot imagine; for, as all structures are variable, that is mutable, in his system this proposition can only inform us that a bat's wing is as variable as it is variable,—a zoological law of no very great depth. In the meantime we learn that though the bat's wing has been as it is for an immense period, yet it is by no means impossible or improbable that another animal may acquire the wing of a bat. "*I see no insuperable difficulty in believing* it possible that the membrane-connected fingers and forearm of the *Galeopithecus* might be greatly lengthened by natural selection, and this, as far as the organs of flight are concerned, *would convert it into a bat*" (p. 209).

Here of course we cannot follow Mr. Darwin, for to be obedient to the faith and to keep to the path of science are very different engagements; "pour être philosophe," says Malebranche, "il faut voir évidemment, et pour être fidèle, il faut croire aveuglement." As we are not of Mr. Darwin's persuasion, we do not accept his revelations.

These progenitors of groups of animals are introduced for two objects; the first and the most important is to meet "the ordinary views, that it so pleased the Creator to construct each animal and plant," and the next, "because it can rarely have happened that natural selection will have modified several species fitted to more or less widely different habits in exactly the same manner." These are Mr. Darwin's reasons in his own words; they both, however, amount to the same thing, that he wishes to exclude the idea of a general plan or a design in the many species of a genus, and therefore he has invented a common progenitor with which he would have us believe that the various species keep up a sort of connection, and so resemble one another more or less, because they are all descended from one common parent.

Now we must observe that Mr. Darwin does not pretend to say that any such progenitor has been discovered in geological research, or that he has ever seen any remnant of such an animal, or ever heard of any in any part of the world; on the contrary, he distinctly says "we never

can know the exact character of a common ancestor of a group (p. 189); which might, indeed, be stated with greater plainness of speech, that we never can know anything at all about it, for all these progenitors of groups are creatures of the imagination which we can neither discover nor describe.

Thus, however, is the doctrine unfolded, "if we suppose that the ancient progenitor, the archetype, as it may be called, of all mammals had its limbs constructed on the general pattern for whatever portion they served, we can at once perceive the plain signification of the homologous construction of the limbs throughout the whole class" (p. 966).

By this contrivance Mr. Darwin persuades himself that he has accounted for the appearance of homologous parts in the organization of all mammalia, but how evident it is that this is merely removing the difficulty to a greater distance, in the remoteness of geological time, as if it were out of the reach of logic in that ultra-mundane obscurity! We are told that the ancient progenitor of all mammalia *had its limbs constructed* on a general pattern. Had its limbs constructed! how were they constructed? Had this progenitor no parents? were the parents of this first mammalian not themselves mammals? Did it not inherit its nature, form, character, organization, and life from its parents, and must it not have been just such an animal as they were? or was the law of inheritance suspended in its favour, and did it come into the world a creature formed altogether on a different plan, and specifically distinct from its parents? This really seems to be Mr. Darwin's idea, that these progenitors *came into being* new creatures at once; they were not begotten and they were not created, and they did not spring from spontaneous generation—neither could natural selection have made them, for they were perfect archetypes all at once. All we can say about them is, that they existed without cause, and came into life unconnected with any previous life.

If, however, this should be a statement to which Mr. Darwin would object, then the other alternative is not to be avoided,—that the supposed progenitor of a group inherited its organization from its parents, in which case it could not be the progenitor of any group or genus, for its parents were the same animals as their progeny, and so onwards, in backward series, *ad infinitum.*

In other words, a progenitor of a group is impossible, unless it were created; but this is a supposition wholly inadmissible in the theory;

indeed, the progenitor has been imagined for the express purpose of dispensing with an act of creation, though the result is, that it has made the need of creation an evident necessity, from which there is no escape. And indeed Mr. Darwin seems to have felt that he has brought himself into this position by the language which he uses, for he tells us that the progenitor of the mammals had its limbs constructed *on the general pattern.* What then? can there be a pattern without a design, and can there be a design without a designer? If it had its limbs constructed on a general pattern, certainly there must have been an act of construction, and a predetermined plan. Neither could this have been effected by natural selection, whom Mr. Darwin frequently describes as a wise artificer, for the progenitor *was the first of its class,* and therefore it must have been produced all at once, and not worked out in millions of ages; the progenitor came into the world the progenitor of a group; it was ready made, the first of all the mammalia, and therefore again we say, that if ever such an animal existed, it was most certainly created, and really had its limbs constructed on a pattern as Mr. Darwin himself says, in words fatal to his own theory.

Nothing daunted, however, with these difficulties, Mr. Darwin has fully persuaded himself of the real existence of these imaginary creatures, as we see in the following declaration:—"for myself *I venture confidently to look back* thousands on thousands of generations, and I SEE AN ANIMAL STRIPED LIKE A ZEBRA, but perhaps otherwise very differently constructed, the common parent of our domestic horse, of the ass, of the hemionus, quagga, and zebra" (p. 195).

If this inexpressible animal has thus really come within the field of Mr. Darwin's vision, if he can see it thus clearly athwart thousands on thousands of generations, why does he not favour us with a scientific description of what he sees? and why, instead of that which would be a most valuable contribution to science, does he make this distressing confession, "We can never know the exact character of a common ancestor of a group"? What! not when we see it? and when we have the imagination and natural selection to help us, which have together wrought such marvels for the theory?

We sadly fear, nevertheless, that Mr. Darwin's telescope for investigating past ages has failed him, that it is a worthless instrument, and that he greatly deceives himself when he tells us that he sees this primordial *equus.* That the glasses must be faulty is evident by his own

words with which he qualifies the result of his observation ; for, when he says that this distant animal " is *perhaps* otherwise very differently constructed," it is obvious that its real organization cannot be discerned.

It requires a strong power of vision to see clearly as far back as thousands on thousands of generations ; the stream of time contracts a haze in its progress ; the world of a million years ago is very misty, and the best glasses are inadequate to penetrate the obscurity of so remote and indefinite an antiquity. (From 'The Darwinian Theory of the Origin of Species Examined, by a Graduate of the University of Cambridge,' pp. 5–11.)

CORRESPONDENCE.

Relation between Plants and Soil.

I am endeavouring to make some investigations into the subject of the relation between plants and soils. Perhaps amongst your readers there may be some who, possessing books or papers treating of the subject, might be disposed to lend me any which they could spare? If I am asking too much, my excuse must be, that living so far from libraries which contain many scientific works, I am unable to obtain the information which I need, viz. how far previous inquiry in this matter has gone. And, again, no doubt there are books known to your readers which no searching of libraries would discover to me. I should be greatly obliged to any one who will kindly help me, either by the loan of books, or by sending me their titles and the names of the publishers, or by giving me any suggestions upon the subject.

Newport, Isle of Wight, April 30th, 1868. FRED. STRATTON.

Notes on Australian Plants.

Having deprived the *Buettneriaceæ*, some time since, of the genus *Macarthuria*, I make some return in referring to that Order *Lachnostachys* (*Pycnolachne*, Turcz.). I had lately occasion to study the fruit, which shows the embryo to be straight, and lodged in the axis of amygdaloid albumen. Indeed the genus is truly Buettneriaceous, though constituting a separate tribe. The æstivation is valvate. The branched indument is that of many members of the Order. The leaves of one species resemble those of *Guichenotia*, of one or two of the others certain *Thomasiæ*. Opposite, moreover, they occur also in *Lasiopetalum*, while in the latter genus the petals are also frequently wanting. A solitary carpel is likewise shown by *Waltheria*, while a simple series of filaments arises from a staminal tube also in *Heritiera*, *Helicteres*, etc.

If *Dasymalla* and *Spartothamnus* (*Teucridium*) are excluded from *Myoporinæ*, the ordinal characters of the latter become far more clear. Indeed, *Spartothamnus*, if not both, are truly Verbenaceous. *Lachnosephilus* is identical with *Mallophora*.

The genus *Villarsia* counts in Australia 18 species, many of which afford excellent characters in their fruit. It is in many respects allied to *Velloya*, among *Goodeniaceæ*. *Menyanthes* differs solely in the simply valvate æstivation of the wingless lobes of the corolla, and in trisected leaves.

Melbourne, March 29, 1868. FRED. VON MUELLER.

Discoloration of the Arctic Sea.

I read Mr. Brown's paper "On the Discoloration of the Arctic Sea" (Journal of Botany, 1868, p. 76) with much interest. It is valuable and suggestive. There are no plants on the land, and no animals in the sea, that have such a wide geographical range as the little Diatoms. The fact that all the best food-fish inhabit waters below 'summer heat,' taken in connection with this paper, is indicative of great fertility in cold seas, and of a law for *marine* vegetation, if not at variance, certainly quite different from the law of land vegetation in its distribution. On land, as we proceed from the equator towards the poles, the soil becomes more "stingy" and the land more barren, but in the sea abundance is marvellous everywhere.

3, *Belsize Square, N.W.*, 12*th March.* M. F. MAURY.

BOTANICAL NEWS.

A paper by Mr. B. Clarke, "On the Production of Varieties by Pruning," etc., has been read before the Linnean Society. The author infers, from experiments he has made, that a peculiarity in the growth of a plant produced by pruning is, in some degree, communicated to the offspring of the first year; that by repeated pruning, always in precisely the same mode, a new variety is soon produced; that the variety, being produced, cannot perhaps be kept up without the aid of pruning; but that, in the case of Indian Corn, there would be no difficulty in keeping up the variety, because the agriculturist could set apart a portion of his crop for seed annually, and prune that part of it in the most advisable manner, which is supposed to be removing the male flowers of every other plant in a row some time before flowering, but at a period which experience must determine. The plan proposed for the increase of the productiveness of Indian Corn is as follows:—The whole of the male flowers are to be removed by cutting the stem across a week or fortnight before the first flowers begin to open, and the females left to be fertilized by individuals growing close beside it; if repeated three years successively, it may be expected this would produce a variety having only half the usual number of male flowers, and, if so, there would be a proportionate increase of flowers at the lower part of the stem, which it may be expected would be female, *i. e.* an increase in the number of spikes of females, or cobs as they are called when matured. If the plants left for the purpose of effecting fertilization had the upper half or two-thirds of the male inflorescence removed before the flowers opened, the variety,

if produced, would take a shorter time by a year or two.* Supposing, then, that the increase of female flowers amounted to only one-fifth, this would be for the United States alone an increase of produce amounting in value to more than £20,000,000 per annum.

The folly of excluding from our botanic gardens all those species which do not specially recommend themselves for their beauty to the eye of the horticulturist or floriculturist, and destroying trees and shrubs which have been inmates of these establishments for several generations simply because they do not happen to be fashionable just at present, has often been commented upon, and would never have been carried to such a length if those papers which advocate the interests of horticulture in the widest sense would simply do their duty. Every true friend of science must regret the alarming disappearance of so many species of great interest from our botanic gardens and sincerely thank Mr. Wilson Saunders, F.R.S., for having established a refuge for such rejected plants. He has just published (Van Voorst) the first part of a work devoted to their illustration, the very title of which, 'Refugium Botanicum,' implies a censure of the pernicious system now in vogue. May it be the beginning of a healthy reaction!

M. Casimir de Candolle has just published a paper on the theory of the leaf, which comes to us as a reprint from the Archives des Sciences de la Bibliothèque Universelle, and which we cordially recommend to the attention of botanists. The general conclusions he arrives at are that a leaf is a branch, the apex of which, after a certain time, becomes atrophied, or ceases to grow, being identically the same as those submitted in September, 1864, by various German botanists to the Meeting of Naturalists and Physicians at Hanover, as mentioned in Vol. III. p. 359 of this Journal.

'Select Ferns and Lycopods, British and Exotic; comprising Descriptions of Nine Hundred chosen Species and Varieties,' is the title of a new work by Mr. B. S. Williams, of the Paradise Nursery, Holloway, London, himself also the publisher. There are 343 illustrations, one of them representing a grove of Tree-ferns (*Dicksonia Antarctica*), on Mount Wellington, Tasmania, taken from a photograph in the possession of the editor of the 'Journal of Botany,' and alluded to at p. 158 of our volume for 1865. The hint there thrown out, that it might be possible to grow in England Tree-ferns in the open air, is thus submitted once more to the consideration of practical horticulturists.

It is gratifying to observe the scientific spirit displaying itself in Venezuela, in the publication of a new periodical, 'Vargasia,' of which the first three numbers have come to hand, and which purports to be the organ of the Sociedad de Ciencias Físicas y Naturales de Caracas. The first number contains, amongst others, a paper on *Gesnera Vargasii*, De Cand., by M. A. Ernst (the

* One plant, having all the male flowers removed, placed between two having the upper half or two-thirds of them removed, would be the better way of making the experiment in the first place. If the male flowers were removed very early by splitting the sheathing leaves open, the experiment might perhaps be less successful as regards utility, in consequence of the growth of the plant being checked; but varieties departing further from the original type might be expected. In one of my plants so treated, the upper spike of female flowers developed a quantity of male flowers at its apex.

founder of the Association), in which he criticizes the views of Dr. Hanstein, and endeavours to prove that *Gesnera barbata*, *Gollmeriana*, *aurantiaca*, *erubescens*, and *Caracasana*, are synonyms of that species. Several papers, translated from this Journal, among them that of Mr. Collins on Caoutchouc, were submitted to, and discussed by the society.

Dr. W. L. Lindsay has published 'Contributions to New Zealand Botany' (Williams and Norgate), 4to, with four coloured plates, which contains a series of papers on the plants of New Zealand, abstracts of some of which we have had the privilege of placing before our readers.

The successful introduction of *Opuntia Rafinesquiana*, Engelm., now sold by Messrs. James Backhouse and Sons, of York, as a hardy plant, will impart quite a new feature to our gardens, as it will doubtless lead to the cultivation of other *Cacteæ* in the open air. It cannot be too often repeated that many *Cacteæ* stand a great deal of cold,—all *Mamillariæ* and *Cerei* with white spines and hair grow at high elevations, and are covered with snow and ice during several months of the year. In 1846, Dr. Seemann recorded (Otto and Dietr. Gartenz. xiv. p. 324) his observations on two species from lesser altitudes (*Cereus Deppei* and *Opuntia cylindrica*), showing that they stood a severe winter without injury.

The author of 'The Darwinian Theory of the Origin of Species examined by a Graduate of the University of Cambridge' has, in a separate pamphlet, added "a supplementary chapter to his work," which deals even more directly than his former writings *with* the *origin* of species, and of which we publish some extracts. The author, whoever he may be, holds that Mr. Darwin has undertaken to explain the *origin* of species by an hypothesis which is peculiarly (?) his own, and if this part of Mr. Darwin's theory is disproved, the whole is confuted; and he arrives at the conclusion that on the great question of the origin of species, *i. e.* the beginning of things, "we have learned nothing at all from the various conjectures and theories of the transmutationists, and, least of all, from Mr. Darwin's."

Dr. Masters sends us a very acceptable reprint of his able paper "On the Morphology of the Commelynaceous genus *Cochliosperma*," which appeared, with illustrations, in the current volume of the 'Gardeners' Chronicle.'

From Dr. Engelmann, of St. Louis, we have a reprint of his 'Revision of the North-American Species of the Genus *Juncus*,' to which favourable allusion is made in Dr. Buchenau's paper in the last number of this Journal.

Mr. John Gilbert Baker has successfully completed the 'Synopsis of all known Ferns' (Robert Hardwicke), 8vo, of the late Sir W. J. Hooker, of which only a few sheets had passed through the press when that venerable botanist died.

At the anniversary meeting of the Linnæan Society, Mr. George Bentham was re-elected President; Mr. Saunders, Treasurer; and Messrs. Busk and Currey, Secretaries. The President delivered an excellent address, reviewing the state of biological science, and Mr. Busk read obituary notices of Fellows who died during the last year.

Prof. Gœppert, of Breslau, has discovered an alga-like enclosure in diamonds which bears some resemblance to *Palmogloëa macrococca*, Kütz.

We have received another part of Key's 'Flora of Devon and Cornwall,' containing *Balsaminaceæ* to *Umbelliferæ;* a reprint for private circulation from the Transactions of the Plymouth Institution.

Lieutenant-General G. A. von Jacobi, of Breslau, has resumed his examination of the *Agaveæ*, interrupted by the German war, and now sends us a supplement to the papers on the subject published by him in Otto's 'Hamburger Gartenzeitung.' From this we learn that there are now known 134 species of *Agave*, 13 of *Fourcroya*, and 8 of *Beschorneria*.

EDINBURGH BOTANICAL SOCIETY, *April 9th*.—Prof. Balfour in the chair. The following communications were read:—1. On the Genus *Lophiostoma* of British Fungi. By M. C. Cooke, Esq.—2. On the British Species of *Delphinium*. By Dr. W. R. M'Nab. Dr. M'Nab stated that while examining the *Delphiniums* in the University herbarium, he had been led to the conclusion that there were three instead of two (*D. Consolida* and *D. Ajacis*) British species, and he proposed that the new species should be called *Delphinium addendum*. The following is the description:—Stem erect, about 1 foot high, subpubescent; branches erect. Leaves multifid. Racemes 2–7-flowered; petals combined, spur longer than the calyx; pedicels longer than the bracts. Ovary abruptly narrowed into a short style; follicle downy. Flowers blue, pink, or white. Cambridgeshire. The paper was illustrated by dried specimens. [Prof. C. C. Babington authorizes us to add that he doubts the distinctness of the proposed species from *D. Ajacis*.—ED.]—3. Report on the Open-air Vegetation in the Royal Botanic Garden. By Mr. M'Nab.—4. Miscellaneous communications. Mr. Robert Brown presented and made some remarks on various articles which he had brought from Vancouver's Island, Oregon, and other parts of North-west America, principally illustrative of the economic uses of *Coniferæ*, etc. Considering the varied uses to which *Thuja gigantea* is put, it might well be styled "the Bamboo of the North-western Indians. The bark is woven into mats embroidered into lozenge-shaped spaces and borders, with bark of a darker colour, stained by steeping it in a mixture of oil, charcoal, and water. These mats are used in a variety of aboriginal modes of existence, and the manufacture is a marked feature in their domestic economy. The bark teased out is woven into blankets and cloaks, and used for gun-wadding. The wood splits easily and forms boards for their lodges, and the trunks are hollowed out into their beautiful canoes. The twigs are so tough as to be used as withes to sew together the detached pieces of the canoe, as well as to bind the boards of the lodges to the upright posts. The leaves are even smoked in times of tobacco famine. The bark is often used to roof temporary houses, and is a common material for canoe scoops. The wood is almost indestructible underground, and it is extensively used in the construc-truction of pickets or other works in which durability is required in the earth. It might be used much in railway sleepers, and, being very light, might be easily wrought for window sashes, doors, etc. It is one of the most beautiful trees in North-west America, and ought to be extensively planted in England. Mr. Brown also exhibited and described a large series of drawings and photographs, illustrative of the forests and forest-trees of the same region, including a number of views of *Sequoia Wellingtonia*, Seem. (*Wellingtonia gigantea*, Lindley); *Thuja gigantea*, Nutt.; *Abies Menziesii*, Dougl.; *Abies Bridgesii*, Kell.; *Pinus contorta*, Dougl.; *Pinus Lambertiana*, Dougl.; *Abies Douglasii*, Lindley; *Arbutus Menziesii* (*procera*), Hook.; *Pinus monticola*, Dougl.; *Alnus Oregana*, Nutt.; *Juniperus Henryana*, R. Br. ms.; *Cactus gigantea*; *Sequoia sempervirens*, etc.

W H Fitch, del et lith

ON TWO NEW GENERA OF SMILACINEÆ.

By Berthold Seemann, Ph.D., F.L.S.

(Plates LXXXI. and LXXXIII.)

An examination of the large genus *Smilax* has convinced me of the necessity of establishing two new genera, which I shall name respectively *Pleiosmilax* and *Oligosmilax*.

Pleiosmilax, Seem. (gen. nov.). Flores diclines. Perigonium corollinum, 6-phyllum, patens, foliolis æqualibus. Fl. ♂: Stamina duple foliolorum numero; filamenta filiformia, libera; antheræ ovatæ v. oblongæ, basifixæ. Fl. ♀: Stamina 10, sterilia (v. 0?). Ovarium 3-loculare. Ovula in loculis 1. Stigmata 3. Bacca 3-locularis, 3-sperma. Semina elliptica.—Frutices sempervirentes, scandentes; radicibus tuberosis v. fibrosis; caule inermi v. aculeato; foliis alternis petiolatis, cordatis v. ovatis, nervosis, reticulato-venosis; stipulis intrapetiolaribus cirrhiferis; floribus umbellatis, umbellis axillaribus, ♂ racemosis, ♀ solitariis; baccis nigris.—*Smilacis* sp. auct.

This genus differs from *Smilax* principally in having twice as many stamens as perigonal leaves. Three species are at present known, viz.:—

1. *P. Vitiensis*, Seem.; inermis, glabra; caule terete; foliis subcordatis v. ovato-oblongis, acuminatis, 3–5-nerviis, coriaceis; pedunculis ♂ 2–3-fidis, perigonii foliolis 6 ovato-oblongis acuminatis 1-nerviis, antheris ovatis; pedunculis ♀ simplicibus; baccis globosis (nigris) 3-spermis.—Nomina vernac. Vitiensia, "Kadragi," "Wa rusi," et "Na kau wa."—Islands of Ovalau, Vanua Levu, Viti Levu, and Kadavu (Seemann! n. 631, ex parte).

This is closely allied to *P. Sandwichensis*, but the leaves are somewhat differently shaped and have fewer ribs, and the anthers are different in shape and size. The leaves of the lower part of the stem are very large, often measuring a foot in length and nine inches across. The male umbels are arranged on short forked peduncles, the middle umbel being always the largest, and longer than the petiole; whilst the female umbels are on simple peduncles, which are shorter than the petiole. Female flower is unknown. The berry is round and black, and contains three seeds.

2. *P. Sandwichensis*, Seem. (*Smilax Sandwichensis*, Kunth, Enum.

Plant. vol. v. p. 253; *S. pseudochina*, Hook. et Arn. Bot. Beech.?; Nomen. vernac. Hawaiense, teste Barclay, "Aka-ava"), collected in Oahu (Seemann! Macrae! Hillebrand!) and Atoi (Barclay!), where it is used by the natives for tying the rafters of their houses.

3. *P. Menziesii*, Seem. (sp. nov.) (Tab. LXXXI.); caule teretiusculo petiolisque dense aculeato; foliis ovato-oblongis, acuminatis, 7-nerviis, supra inermibus, subtus ad costas aculeatis; umbellis ♂ racemosis, rachidibus inermibus bracteatis, bracteis ovatis acuminatis, pedunculis compressis ebracteatis, receptaculis globosis, perig. foliolis 6 oblongo-linearibus; umbellis ♀ solitariis, pedunculis aculeatis.—Sandwich Islands (Menzies! in Herb. Mus. Brit. et Kew).

A very singular species. The branches, petioles, peduncles of female flowers, and the ribs of the lower side of the leaves are covered with spines, much more minute and dense than they are in many species of *Smilax*.

Explanation of Plate LXXXI., representing *Pleiosmilax Menziesii*, Seem., from specimens kindly lent by the Kew Museum. Fig. 1, branch with female flowers; 2 and 3, male flowers; 4, female flower; 5, section of ovary: fig. 1 and 2 natural size, all the others magnified.

(*To be continued.*)

NOTES ON THE FLORA OF SUSSEX.

By W. B. Hemsley, Esq.

The following notes relate principally to those plants recorded in the Supplement to Watson's 'Cybele Britannica' as of doubtful occurrence in the county, with some additional species, chiefly "segregates," little known or unpublished at the time the Supplement appeared. From the various contributions I have received towards my projected Flora of the county, and my own investigations, I can unhesitatingly exclude several species enumerated by Mr. Watson, some with and some without the sign of doubt, as growing in the county, and clear up the uncertainty regarding several other species, the authorities for which he considered insufficient to entitle them to a place in the Flora without reliable corroboration. It is desirable that this should be done now, as, in consequence of the drainage of bogs, enclosure of commons, conversion of woodland into arable land, and the depreda-

tions of rapacious and careless collectors, many plants formerly abundant are now restricted to a few isolated localities, and others have been quite exterminated.

The following species, of doubtful occurrence in the county, according to Watson, may be safely included:—

Thalictrum flavum.
Aquilegia vulgaris.
Erysimum cheiranthoides.
Silene Anglica.
Lavatera arborea.
Melilotus vulgaris.
Sedum reflexum.
Fœniculum vulgare.
Inula Helenium.
Tanacetum vulgare.
Villarsia nymphæoides.
Atropa Belladonna.
Veronica Buxbaumii.
Mentha piperita.
Myosotis sylvatica.
Chenopodium urbicum.
Atriplex arenaria.
Polygonum Bistorta.
Populus alba.

New to the county are the following, which, with a few exceptions, are segregates whose aggregates were given by Watson:—

Ranunculus Baudotii.
R. trichophyllus.
R. floribundus.
R. peltatus.
R. Drouetii.
? Dianthus deltoides.
Arenaria leptoclados.
Sagina nodosa.
Onobrychis sativa.
Rubus suberectus.
R. fissus.
R. plicatus.
R. nitidus.
R. rhamnifolius.
R. thyrsoideus.
R. Grabowskii.
R. carpinifolius.
R. Kœhleri.
R. Guntheri.
R. Balfourianus.
R. rosaceus.
R. pygmæus.
R. diversifolius.
R. Lejeuni.
R. althæifolius.
R. tuberculatus.
Epilobium tetragonum.
E. obscurum.
? Herniaria glabra.
? Drosera Anglica.
Arctium tomentosum.
A. minus.
A. majus.
Erythræa latifolia.
Thymus Serpyllum.
Statice occidentalis.
Euphorbia palustris.
Ruppia rostellata.
Agrostis Spica-venti.
Festuca arundinacea.

Doubtful, according to Watson, and since fully ascertained to have been falsely reported or only accidental introductions, mostly not rediscovered, are the following:—

Lepidium latifolium.
Cardamine impatiens.
Matthiola sinuata.
Erodium maritimum.

Erodium moschatum.
Epilobium lanceolatum.
Lactuca scariola.
Campanula Rapunculus.
Pyrola rotundifolia.
Veronica verna.
Linaria repens.
Salvia pratensis.
Ajuga Chamæpitys.
Symphytum tuberosum.
Anchusa sempervirens.
Asperugo procumbens.
Cynoglossum montanum.
Chenopodium glaucum.
C. botryoides.
Euphorbia Portlandica.
Salix pentandra.
Orchis fusca.
Potamogeton zosterifolius.
P. heterophyllus.
P. plantagineus.
Polypodium Dryopteris.

The following species are given without doubt by Watson, but I have not met with any of them in the county :—

Sisymbrium Sophia.
Polygala calcarea.
Medicago falcata.
Rubus Hystrix.
R. rudis.
R. incurvatus.
Potentilla argentea.
Carduus eriophorus.
Ballota fœtida.
Potamogeton filiformis.

Lost species :—

Matthiola incana.
Vicia Bithynica.
Sibthorpia Europæa.
Cyclamen hederifolium.
Empetrum nigrum.
Colchicum autumnale.
Fritillaria Meleagris.
Asplenium marinum.

(*To be continued.*)

NOTES ON SOME PLANTS OF OTAGO, NEW ZEALAND.

By W. Lauder Lindsay, M.D., F.R.S.E., F.L.S.

1. Genus Discaria.

D. Toumatou, Raoul (*D. australis*, Hook.).—Uplands around Saddle-hill; Fingand, Lower Clutha; Balmoral Bush, Inch Clutha; on roadsides, Greenisland: October and November, young, W. L. L.

It is generally as "scrub," or intermixed therewith, that it occurs on the hill-ranges. I never met with it assuming the dimensions of a *tree*. It forms a dense scrub in the channels of the Matukituki, with an undergrowth of *Aciphylla*. Sullivan remarks on its *non*-occurrence in the *west* coast forests, a circumstance which he says, "is undoubtedly owing to the woods having never been devastated by fire." Common in, and forming part of, the dense and impenetrable "scrub" on the Tapanui ranges (Buchanan). Sometimes it furnishes the only fire-

wood to be had on the goldfields, *e.g.* in the gullies about Highlay, at the head of the Waikouaiti river (in 1862), where it forms "scrub," as *Leptospermum*, *Coprosma*, *Gaultheria*, *Coriaria*, *Fagus*, and other shrubs do elsewhere in Otago.

The plant is much more conspicuous for its *spines* [which are very rigid and sharp, about 1–1½ inch long, and which project from the very strong woody stem or branches at more or less right angles] than for flowers or foliage. The latter are, as in *Carmichælia*, generally so few and inconspicuous as to appear virtually absent, and the shrub has a peculiar bare, dry, Australian physiognomy. In the shade and moisture of the Bush, however, the *foliage* is developed in greater proportion to the spines, which are much less rigid, while the whole plant becomes greener, handsomer, and much less formidable than when its place of growth is exposed. In cultivation it becomes dwarfed and very spiny, forming an excellent *hedge-shrub*. Buchanan remarks, that "if properly trained, it would form a handsome hedge that would be stronger than Whitethorn." My roadside specimens are, as in the parallel case of *Carmichælia*, very strong, hardy, woody, low shrubs, with very tortuous branches, and almost no foliage; the plant having a peculiar parched, leafless aspect. My Bush forms, on the other hand, are altogether taller, more leafy, greener, with longer, more delicate spines, and more symmetrical branches. The *spines* are frequently 1¾–2 inches long, and $\frac{1}{12}$ inch thick; varying in rigidity and stoutness; frequently also of nearly uniform thickness up to the insertion of the point (or bristle). The latter appears as if articulated to the spine, from which it differs in colour and thickness; tapering either suddenly or gradually; it varies in length, sharpness, and rigidity. *Leaf* sometimes ¾ inch long, and ⅙ inch broad; glabrous, entire or sometimes irregularly and slightly notched; apex frequently retuse. Puberulence of calyx and flower-pedicels obscure.

To the North Island Maori, who formerly used its spines as a bodkin for tattooing, the plant is known as the "Tumatukuru," which by the settlers is variously spelt or corrupted "To-matou-kaurow" (Buchanan), "Tomatagora," "Tomatuguru," "Matagora," or "Matacoura;" while in Otago it is also designated "The Thorn" or "Hawthorn," or "Prickly Thorn;" and, according to the Handb. Fl. N. Z., by the New Zealand colonists generally, "Wild Irishman,"—a term in Otago I heard applied only to *Rubus australis*.

2. Genus Carmichælia.

Only in the young state do its species bear an extremely minute inconspicuous *foliage;* so that the plants are almost virtually leafless, and have, in this respect, more an Australian than a New Zealand physiognomy. During its flowering season the flower frequently appears alone, without a trace of foliage; but the flowers are insufficient as regards either number or size to relieve the barrenness of the filiform naked branches. The development of foliage depends greatly on habitat. On hot, dry, dusty, exposed roadsides, for instance, the plant is frequently a mere mass of bare, leafless, flowerless, rigid, or twiggy branches, resembling a bundle of our "Broom" twigs (*Sarothamnus scoparius,* Wimm.) stripped of their foliage. In this condition it is one of the "shabbiest-looking" shrubs in Otago,—very unlike the "bonny Broom" of Scotland, with which the settlers take the liberty of comparing it! But in the shade and moisture of the Bush the same shrub becomes comparatively leafy, flowery, and handsome. Under *cultivation,*—as in shrubberies,—the plant becomes ornamental (I saw, in 1867, some species cultivated in the Botanic Garden of Edinburgh). The leafless twigs are naturally somewhat succulent—a property which is increased by cultivation or by habitat, —so that Buchanan suggests that some of those species that have the habit of the common Broom, and abound with succulent twigs, which are greedily eaten by horses, might be introduced among furze-copse as hill-fodder in the colony itself.

Species of this genus are common in the bush and scrub of Stewart's Island (Port William and Paterson's Inlet), and in various parts of the west coast (Preservation Inlet and Chalky Bay, Hector). These probably include *C. crassicaulis,* Hook. f., *C. nana,* Col., *C. grandiflora,* Hook. f., *C. australis,** Br., and *C. flagelliformis,* Col., some of which are alpine or subalpine, ascending to 5000 feet.

The genus *Carmichælia* is one whose species should be carefully studied by local botanists in the living state, inasmuch as our know-

* This species appears to be more familiar to the Maoris than any other of its genus, if we may judge from the number of names under which it is known. These include the following:—"Maukaro" or "Maukoro:" "Neinei" (Lyall)—also applied to the North Island *Dracophyllum latifolium,* A. Cunn. (Colenso): "Makaka"—also applied to an Orchid, *Orthoceras Solandri,* Lindl.: "Whakaka," or "Wakaka" (Lyall)—a term so like "Makaka" as to give rise to the suspicion that, in one or other case, the initial letter is an error?

ledge of their limitations or variations cannot yet be said to be satisfactory or complete.

C. flagelliformis, Col. Roadsides, and in Abbott's Creek, Green-island: November, in flower: in the scrub about Finegand, Lower Clutha: December, in fine flower, W. L. L. With other species, known to the settlers as "Native Broom." A shrub a few feet high, in all cases in which I met with it; varying, however, in size, succulence, foliage, and flowering according to the character of its habitat. Named by Dr. Hooker, in my herbarium, *C. juncea;* but has the characters rather of *C. flagelliformis*, to which apparently he refers it in the Handb. (p. 50). A large shrub, the size of our Broom; leafless; one specimen in flower. Much branched; older branches short, woody, about $\frac{1}{8}$ inch in diameter; frequently as if abruptly cut off, terminating in obtuse points. Younger branchlets terminate in filiform shoots; and sometimes retain their greenness in drying, though sometimes also all the branches acquire a brown hue, even in the growing state; the larger branches are frequently brown; main branches cracked or grooved, smaller ones generally deeply and irregularly grooved; all the branches terete, stout, fibrous; tips of branchlets pubescent, as are also the racemes and calyces. Racemes frequently 3-flowered. Flower-pedicels about $\frac{1}{8}$–$\frac{1}{6}$ inch long, always longer than calyx, sometimes twice as long, very silky-pubescent, with greyish-white appressed hairs.

3. Genus Linum.

L. monogynum, Forst. Along the edge of the Bush, on a shingly beach, Willshire's Bay, mouth of the Clutha; on the cliffs, Shaw's Bay, The Nuggets, 8–12 inches high: December, in flower; W. L. L. The "Native Flax" of the settler; the "Rauhuia" (Colenso); "Kaho" (Cunningham), or "Wao" (D'Urville) of the North Island Maori.

Some of its forms resemble our common *L. usitatissimum*, L. At the New Zealand Exhibition of 1865, Mr. Smith, of Napier (Hawke's Bay), showed specimens of what he termed *L. perenne*, L., which was said to grow wild in that province:* and he also exhibited some of its roughly scutched fibre, which resembles the lower kinds of Baltic Flax. It may thus prove that there is more than one New Zealand species of *Linum.*

My plant appears to be var. *grandiflorum* of the Handb. 35. I

* Jurors' Reports, p. 122.

have two sets of specimens; the one smaller in flower, the other taller in fruit. The latter is also more slender; the branching at the top more open; the sepals sometimes shorter than the capsule. This larger form differs little from *L. usitatissimum*, L., as it occurs in my British Herbarium from Charleston, Fifeshire. Both forms are erect, shrubby, and woody, with simple branches. Leaves vary much in length; in one form they do not exceed ½ inch, while in the other they are ¾–1 inch long; in the former case being broader, in the latter narrower; form varies from lanceolate to oblong-linear, or linear-lanceolate; apex subacute to subobtuse; colour in drying in one form becomes brown or blackish-brown, while in the other it retains its pale greenness; one nerve only is at all distinct; margin revolute in both forms. Branches and flower-peduncles sometimes much grooved. Sepals show 3 (sometimes 5) nerves distinctly in the fruited forms; the medium one very prominent, more so than that (midrib) of the leaves; it is less distinct, but still easily distinguishable under the lens, in flowering specimens. Sepals about equal in length to the capsule in the flowering, smaller form. Flower ¾ inch long, white, handsome.

I see no necessity for the two named *varieties* recorded in the Handbook: their distinguishing characters are of insufficient value.

The plant is cultivated in British nurseries, and is known to nurserymen as a "fine perennial species, with dwarf branching habit, covered with large snow-white flowers of the size of the scarlet annual, *L. grandiflorum*."* It is cultivated about Edinburgh, but is regarded as "very precarious in this climate." (Lowe.)

4. Genus Muhlenbeckia (Polygonum, *Fl. N. Z. pr. p.*)

M. adpressa, Lab. (*Polygonum australe*, Fl. N. Z.; *P. adpressum*, Hook. f. in my herbarium). Myres Bush, Inch Clutha: November, in flower, W. L. L. The "Puka" of the North Island Maoris, who apply the term "Pohuehue"† to the closely allied *M. complexa*, Meisn.

In my Otago plant the branches are woody; the flowering twigs very sparingly leafy. Leaf-petiole ½–¾ inch long. Leaf coriaceous, glabrous, suborbicular, ¾–1 inch in diameter, distinctly mucronate or acuminate; dries to a leathery or blackish-brown.

* 'Catalogue of Alpine Plants and Hardy Perennials,' by Backhouse and Son, York, 1865, p. 14.

† Also applied to *Convolvulus sepium*.

Gorrie describes to me two plants cultivated at Trinity, near Edinburgh, which may be referable to different ages or states of this species; to different forms of *M. complexa:* or the one to the former and the other to the latter species. It seems to me extremely doubtful whether *M. adpressa*, *M. complexa*, and *M. axillaris*, Hook. f., should be separated as species. Certainly the trilobate leaf is not *per se* a sufficient specific character. The one of Gorrie's plants has an entire, the other a trilobate leaf, or one which always exhibits a notch in each side about its centre. The first plant has proved itself, during the last twenty years, *quite hardy*, and a vigorous grower in various localities about Edinburgh (*e.g.* Prestonhall and Trinity). I saw a plant of it (from Otago seed) growing very luxuriantly as a climber against a wall at Trinity,—its growth being so free and rapid that it was said to require frequent cutting down. The second plant (from Otago) also appears hardy; though its shoot-points and leaves, which were exposed thereto, were injured by the frost of January, 1867.

5. Genus Myrtus.

M. obcordata, Hook. f. Christie's Bush, Saddlehill: November, young: W. L. L. The representative, in Otago, of our *Myrica Gale*, L., to which it bears considerable resemblance in habit.

My Otago plant approaches *M. pedunculata*, Hook. f. It is decumbent, much branched; the branches delicate or slender; the foliage sparse, and mostly clothing the ends of the branchlets. Puberulence very obscure or absent. Leaf $\frac{1}{3}$–$\frac{1}{2}$ inch long; $\frac{1}{4}$–$\frac{1}{2}$ inch broad; variable in form; lanceolate, ovate, cordate, or subspherical, never distinctly obcordate; apex obtuse; margin sometimes thickened, irregularly crenulate or notched, or sublobate.

Tarndale (Nelson) specimens in my herbarium, collected by Dr. Sinclair, differ somewhat from my Otago plant. Neither group of specimens is in flower. The Tarndale plant is erect, but more shrubby and dwarf, much stouter, with much denser foliage and more coriaceous leaves. Branches stout and woody. Leaf-petioles and tips of branchlets pubescent with grey appressed hairs; branches very slightly pubescent, either in Otago or Tarndale plant. Leaf much more uniform in shape and size in Tarndale specimens; generally obcordate with notched apex.

6. Genus Viola.

1. *V. filicaulis*, Hook. f. Glen Martin, Saddlehill; Signal Hill, North East valley, Dunedin: December, in flower and fruit, W. L. L. The Signal Hill plant is stronger than the Glen Martin one, having smaller, but more crowded leaves.

Stem weak, filiform, trailing. Leaves variable, even in same individual: subreniform or subrhomboid, generally obtuse, all more or less crenate. Petioles do not exceed ½ inch long, very slender. Stipules very membranous, scarcely greenish, irregularly lacerate; teeth whitish, pellucid, tipped by small black glands, resembling the spermogonia of some fruticulose Lichens (*e. g. Cladonia*).

2. *V. Cunninghamii*, Hook. f. Saddlehill, and Chain Hill ranges: November, in flower: W. L. L.

7. Genus Samolus.

S. repens, Pers. On the cliffs, Springfield, Greenisland: November, young, W. L. L. The "Wild Thyme" of the Otago settler: the plant somewhat resembling, in habit, our common *Thymus Serpyllum*, L.

Leaf varies greatly as to length and tenuity; longest leaves arise from the base of the branches; the longer ones are generally more spathulate, the shorter more ovate or obovate. Petiole sometimes ½–¾ inch long, sometimes so short that the leaf is subsessile. Lamina generally broadly spathulate; apex acute or obtuse, about ⅙ inch, sometimes ⅓ inch long, and $\frac{1}{10}$ inch broad; whole leaf is sometimes nearly 1 inch long.

8. Genus Euphorbia.

E. glauca, Forst. Sand dunes about mouth of the Kaikorai. October, young, W. L. L. The "Wainatua" of the North Island Maori (Colenso); a term also applied to the North Island *Rhabdothamnus Solandri*, A. Cunn. [N. O. *Gesneriaceæ*.]

A coarse, straggling, strong plant, whose rhizome creeps under the surface of the sand after the manner of that of *Demoschœnus* and other New Zealand sand-sedges, sending up at intervals stout, erect stems, generally 1 foot tall. The glaucous character of the leaf is distinct only on undersides and tips: in the young leaves: and at the extremities or young shoots of the stems. Form of leaf variable, though mostly oblong-lanceolate; size generally under 2 inches long and ½ inch broad.

9. Genus Taraxacum.

T. Dens-leonis, Desf. (*T. officinale*, Fl. N. Z.).

Major forms; uplands about Fairfield, Saddlehill. Common: apparently our ordinary British plant. Tuapeka ranges, flowering stem 4–5 inches high,—a modification of the type. W. L. L.

Minor form (var. *pygmæa*, Fl. N. Z.): sand dunes, Greenisland coast: November, in flower, W. L. L. Closely resembling our British var. *palustre*, DC., as it frequently grows in Scotland on moorlands.

Leaf varies from sinuate to pinnatifid on same plant: subspathulate, 2½ inches long, by ¼–⅓ inch broad; sometime subacute at tip. Scape only 1–1½ inch long, glabrous. Involucral scales not thickened at tip. My plant corresponds with Fifeshire specimens of var. *β. lævigatum* in my British herbarium [Hill pastures, No. Queensferry] rather than with my British forms of var. *palustre*, De Cand., which has much broader, more entire, and more rounded, larger leaves. *Lævigatum* is, however, larger in its scape and leaves, which are also more divided.

The plant has, undoubtedly, been also *introduced*, and is one of those hardy immigrants, which, like various of the natural and artificial grasses, so-called, of Britain, are rapidly overrunning Otago, displacing and replacing much of its indigenous herbaceous vegetation. I do not believe it possible to distinguish the *native* from the *introduced* plant. Dr. Hooker refers the dwarf mountain forms to the *indigenous*, and the larger, luxuriant, succulent forms (as abundant in Otago as at home, on the waste ground surrounding dwellings or towns) to the alien or *introduced* plant. In the Handbook (165) he speaks of the former as "*certainly* indigenous;" but I do not admit the *certainty* of the conclusion, or, if I did, I should find it impossible to admit, with Dr. Hooker, that various British introduced weeds could occur at considerable elevations* on the alps, very remote from pasturages or settlements of any kind (e. g. *Kœleria cristata* at 4000 feet on the Canterbury Alps).

10. Genus Sonchus.

S. oleraceus, L. Fairfield uplands; common. Shrubby and much branched; about 1 foot high. Seaward or exposed edge of Greenisland Bush; very common; also shrubby, but dwarfed; while on the

* *Vide* my Paper "On Otago *Glumaceæ*," Transactions of Botanical Society of Edinburgh, vol. ix. p. 65.

rich virgin loam, and in the moist shade of the forest itself, it generally grows luxuriant and succulent, and more like our ordinary British weed. Myres Bush, Inch Clutha; very luxuriant. Chain Hills, where it is sometimes a tall, bare plant, nearly 1 foot high, with a few delicate leaves about its base, and a small head of flowers. October to November, in flower; December, in fruit, W. L. L. More or less abundant in every part of the province I visited, Otago specimens being usually quite indistinguishable from British ones. Generally under 1 foot high. Stem in one specimen $\frac{1}{8}$ inch, in most others $\frac{1}{4}$ inch in diameter. Variations in the size and degree of division of leaf infinite. Sometimes it is $2\frac{1}{2}$ inches broad, and about as long; and from this dimension it varies to 1–$1\frac{1}{2}$ inch long, $\frac{1}{4}$ inch broad. Leaves all more or less divided, though the divisions are not so numerous, or narrow, or toothed as in Fifeshire specimens in my British herbarium; division extends to midrib or not. Petiole sometimes $1\frac{1}{2}$ inch long, at other times it is absent, the lamina extending to the stem, from which the leaf is given off. Sometimes none of the leaves (in Chain Hill specimens) are large and deeply pinnatifid, with a large terminal lobe; but all are comparatively simple, and all clasp the stem, and are scarcely petiolate. Teeth frequently have scarcely a prickly character. Heads in all my specimens close, few, and panicled. Achene glabrous, longitudinally striate (ribs not very prominent), rugose, with transverse wrinkles. Involucre and peduncles quite glabrous.

The same problem occurs here as in the case of *Taraxacum Dens-leonis*, viz. how, and whether it is possible to distinguish the *indigenous* from the *naturalized* plant; for the *imported* English "Sow-thistle" is undoubtedly much more abundant than the *native* plant,—overrunning the country, with other species of *Sonchus*, and with species of *Carduus* and other hardy British *Compositæ*. The Maoris are said to recognize a distinction between the native and introduced forms; they are in the habit of chewing its hardened juice as a salivary stimulant and in lieu of the narcotics, which the Malay and Polynesian islanders use in a similar way;* and experience has taught them to prefer for such a purpose the *introduced* to the *native* plant. But I confess myself unable, as in the case of *Taraxacum*, to discover any good *botanical* distinctive character. Such are its resemblances to the

* As they also use Kauri gum and Bitumen. Thomson's 'Story of New Zealand,' vol. i. p. 193.

ordinary British plant, and such the usual character of its habitats (in the vicinity of settlements) that I should be disposed to regard the plant as, in all cases in which I saw it, *introduced*, were it not that my friend Mr. Martin, and others of the original settlers of 1847–8, assure me the plant must be a *true native*, flourishing as it did in Otago, long prior to the advent of colonists.*

The "Porerua," or "Puwha,"† or "Pua," of the North Island Maori, who recognizes also "the Small Sowthistle" as "Pua iti." (Dieff.)

NOTES RESPECTING SOME PLYMOUTH PLANTS.

By T. R. Archer Briggs, Esq.

Ranunculus auricomus, L. This plant has been considered rare about Plymouth, but being an inconspicuous species, is probably often overlooked. Unrecorded local stations are a wood at Plympton Maurice; a bank near Harestone; woods on both sides of the Yealm, near Yealmpton; Maristowe. Wood near Sheviocke, Cornwall.

Hypericum hirsutum, L. So very rare in the extreme south-west of Devon that within twelve miles of Plymouth I have only met with it in one locality, a wood between Puslinch Bridge and Yealmpton, where several plants of it occur.

Potentilla argentea, L. It may be worth while to observe, that six plants are growing this season at Trevol, Cornwall, where I found only one in July, 1865 (*vide* Seemann's Journ. Bot. Vol. III. p. 350).

Mespilus Germanicus, L. A large and abundantly spinous bush in a hedgerow just beyond St. Stephen's "by Saltash," on the road to Forder. In a lane, in the same neighbourhood, between Weard Quay and the St. Stephen's and Saltash Road, this species forms a considerable portion of the hedgerow for a distance of about eight yards, and a single bush occurs on a hedgebank, between fields, at right angles with the lane. The above stations are all in Cornwall. A high bush in a hedgerow near Battisborough Cross, close to the road leading

* [This true native is really a distinct species, viz. *S. asper*, Vill., which was met with in New Zealand by George Forster (Plant. Escul. p. 70), and also occurs wild in the Tongan and Vitian Islands. The naturalized plant here spoken of is *S. oleraceus*, L., Koch, Synopsis, and is certainly specifically distinct.—B. Seemann.]

† According to Dieffenbach, what is evidently the same word, "Puwa," is applied to the Thistle, also a naturalized plant.

thence to Mothecombe. *Pyrus communis*, L., occurs in the same hedge, and I suspect that both it and the *Mespilus* were originally planted at Battisborough.

Physospermum Cornubiense, De Cand. Scattered all over, and abundant in some parts of a piece of uncultivated ground, rather more than an acre in extent (according to a rough calculation), situated between Inchers and Blaxton, on the brow of the hill above the right bank of the tributary of the Tavy, that flows down to the latter place. From Calstock, in Cornwall, the nearest recorded station of the *Physospermum*, this one is distant, in a straight line about five or six miles, and from New Bridge, near Tavistock, its only previously known South Devon one, seven or eight. It is probable that cultivation has restricted its range between Blaxton and Inchers, as some of the spots in which it most abounds are close to where marks of the ploughshare are visible, and at present (June, 1868) a field of corn adjoins its habitat, without any hedge or fence between. Among the plants associated with the *Physospermum* are *Aquilegia vulgaris*, L.; *Viola canina*, L.; *β. lancifolia*, Thore (Bab. Man. ed. 6); *Potentilla Tormentilla*, Nesl.; *Galium saxatile*, L.; *Serratula tinctoria*, L.; and *Erica cinerea*, L.; and here and there are bushes of *Rhamnus Frangula*, L., and *Quercus Robur*, L. A damp pasture, not much above the sea-level, situated lower down the vale, produces a plant, *Alchemilla vulgaris*, L., rare in the neighbourhood; a bank near it yields *Erodium moschatum*, Sm., and *Geranium rotundifolium*, L., occurs.

Lamium incisum, Willd. Very uncommon near Plymouth. In arable land at Prospect, Weston Peverell, March, 1868. Noticed at the same place in the spring of the previous year, associated, on both occasions, with *Lamium amplexicaule*, L., a species that is local in this part of Devon.

Primula vulgaris, Huds., *β. variabilis* (Bab. Man. ed. 6), *P. officinali-vulgaris*, Syme, Eng. Bot. ed. 3. Many specimens of this hybrid grow on hedgebanks about Maristowe, one of the localities near Plymouth, where *Primula veris*, L., occurs in most abundance. Farming operations have there, to some extent, restricted the latter to banks and the borders of fields, and it is on hedgebanks where *P. vulgaris* and *P. veris* are brought into proximity to each other, that the hybrid usually grows. Some examples most resemble one parent, others the other; but all have at least some of the flowers raised on a scape,

and generally all are thus arranged. About the borders of a pasture between Lopwell and Dedham Bridge, I found eight of these hybrids in May, 1868, and there, as at Maristowe, *Primula veris* grows plentifully.

Daphne Laureola, L. Very rare near Plymouth. In a wood, on limestone, between Puslinch Bridge and Yealmpton. A single bush in a wood at Torr on the other side of the valley.

Polygonatum multiflorum, All. In the wood near Yealmpton that produces *Hypericum hirsutum* and *Daphne Laureola*. Scattered all over a large wood on limestone at Torr, on the left bank of the Yealm, growing with *Ranunculus auricomus*, L.; *Lamium Galeobdolon*, Crantz; *Listera ovata*, Br.; *Allium ursinum*; etc., and apparently truly wild.

The places mentioned above are in Devon when the county is not named.

4, *Portland Villas, Plymouth, June* 10, 1868.

DESCRIPTION OF A NEW CHINESE LARKSPUR.

By H. F. Hance, Ph.D., etc.

4778 *Delphinium (Delphinastrum) anthriscifolium*, n. sp.; radice fibrosa, caule erecto flexuoso simplici minute puberulo, petiolis longis basi dilatatis, foliis membranaceis minute puberulis bipinnatisectis laciniis incisis, bracteis inferioribus plerumque incisis supremis bracteolisque linearibus, racemis subsimplicibus, floribus pedunculo æquilongo suffultis albo cæruleoque pictis sepalis petalisque subæqualibus petalis posticis ambitu subdolabriformibus oblique bilobis anticis omnino imberbibus bifidis calcare rectiusculo sepala oblonga paulo superante apice sæpius bidentato, folliculis ternis inflatis glabris divergentibus stylo iis 5-plo breviore superatis, seminibus cochlidiomorphis fuscis lamelloso-annulatis annulis striolatis.—In ins. Silver Island, prope Chin-kiang, Maio 1863 detexit Hay; in alluviis fl. West River, prov. Cantoniensis, circ. 100 mill. pass. occidentem versus ab urbe, Junio 1865, necnon prope rupem calcaream Kai-kun-shek, secus eundem fluvium, Junio 1867 coll. indefessus Sampson. (Exsicc. n. 10125.)

I cannot point out any near relative of this interesting plant, which is readily distinguishable in its section by the beardless petals and

bipinnate foliage; the latter is much like that of *Anthriscus silvestris*, Hoffm., whilst the flowers are usually about the size of those of *D. Ajacis*, L. Mr. Hay's solitary specimen has the leaf-segments much narrower and finer, the flowers smaller, and the spur longer and more slender, but I have no doubt it is conspecific. The very beautiful specimens brought by Mr. Sampson from Kai-kun-shek have afforded excellent materials for the above diagnosis.

TRIFOLIUM SUBTERRANEUM, ETC., IN IRELAND.

By Alexander G. More, F.L.S.

In the month of June last year, I had the pleasure of adding *Trifolium subterraneum*, L., to the Irish flora; I found it growing rather sparingly on the short sandy pasture which borders the north side of the river opposite the railway station, and quite close to the town of Wicklow. On the sandhills, a little north of the town of Arklow, grow *Eleocharis uniglumis*, *Juncus acutus*, and *Equisetum Moorei*. The two latter plants occur here and there on many different points of the coast between Wicklow and Arklow, both of them apparently finding their northern limit together in a little cove opposite Sea-Park House.

With regard to *Juncus acutus*, I find that the date of flowering is given incorrectly in most of our books. It flowers early in June, and all the plants which I saw at the beginning of July were already in seed, while at this date *Juncus maritimus* had scarcely shown its panicle.

Glasnevin, *May* 25, 1868.

THE DARWINIAN THEORY.—II.

Having examined the pretended existence of progenitors, we proceed now to make some inquiry into that which must have preceded all progenitors,—the primordial form from which it is said that life started, and from which all other forms of life have derived their origin. To understand this doctrine clearly, we give the text which teaches it from the third and fourth editions of Mr. Darwin's book,

for there is a difference in the text thus examined which it is important to understand :—

Third Edition.

"A difficulty has been advanced, namely, looking to the dawn of life, when all organic beings, as we may imagine, presented the simplest structure, how could the first steps in advancement or the differentiation and specialization of parts have arisen? I CAN MAKE NO SUFFICIENT ANSWER, and can only say that as we have no facts to guide us, all speculation on the subject would be *baseless* and useless. It is, however, an error to suppose that there would be no struggle for existence, and consequently no natural selection until many forms had been produced; variations in a single species inhabiting an isolated station might be beneficial, and through their preservation either the whole mass of individuals might become modified, or two distinct forms might arise. But I must recur to what was stated towards the close of the Introduction, when I say that no one ought to feel surprise at much remaining as yet unexplained in the origin of species, if due allowance be made for our profound ignorance of the mutual relations of the inhabitants of the world during the many past epochs of its history" (p. 137).

Fourth Edition.

"A difficulty has been advanced, namely, that looking to the dawn of life, when all organic beings, as we may imagine, presented the simplest structure, how could the first steps in advancement or in the differentiation and specialization of parts have arisen? Mr. Herbert Spencer would probably answer that as soon as the most simple unicellular organism came by growth or division to be compounded of several cells, or become attached to any supporting surface, his law would come into action, namely, 'that homologous units of any Order become differential in proportion as their relation to incident forces become different;' but as we have no facts to guide us, all speculation on the subject is useless. It is, however, an error to suppose, etc."

Here the remainder of the paragraph is the same in the two editions.

In the third edition, then, we see that Mr. Darwin, having stated the difficulty, fairly tells he can make no sufficient answer; but as this perhaps might be considered too large a surrender, the acknowledgment is cancelled in the fourth edition, and Mr. Herbert Spencer's law is introduced as a sort of forlorn hope in its place. Mr. Darwin has evidently no great confidence in that mysterious formulary, for he does not urge that it will meet the case, or that it is any real answer to the difficulty; but such as it is, it may amuse those who are apt to be

swayed by words, particularly when they express the greatest nonsense with the greatest solemnity. So, then, in the fourth edition the concessions of the third are qualified, and the word "baseless," which had been selected as the proper designation of such speculations, is cancelled. In the fourth edition, indeed, they are useless, but not baseless; all hope of a foundation is not utterly rejected, for something of the sort may perhaps be discovered by those who will go as deep as Mr. Herbert Spencer, and at the very bottom of all things homologous units may perhaps become differential.

Nevertheless, in both the editions the contradiction remains, that after telling us all speculations on such a subject would be useless, Mr. Darwin himself undertakes to furnish us with an answer to the difficulty. He tells us, as we have seen, "that in the very dawn of life there would be a struggle for existence, variations might be beneficial," and natural selection would commence her operations. After all, then, these speculations are neither baseless nor useless, and Mr. Darwin proposes a solution for the difficulties of the case, which, if it would bear examination, would solve the problem.

Let us now examine this "speculation," and see if it supplies the deficiencies of the imaginary progenitors. Let us suppose that A. is the first primordial form which has received its organization and life by an act of creation, what is the next move? A. produces A^2, but how? surely by generation, so that A^2 inherits its organization and life from A., and is nothing more nor less than a reproduction and perpetuation of A. Here, then, there is no step in the scale of organized beings. A. may be multiplied in its offspring to any extent, but still we have only A^2, for the offspring only perpetuates the parent. How, then, does a new creature make its appearance? How do we see a real independent B., which does not perpetuate A., but is a new organization, distinct from A., constituting a new species? "Variations," we are told, "in a single species, *might be beneficial*," that is, it might be better that a change should take place, and therefore a change does take place *by accident;* a new creature B. is formed by natural selection; B. exterminates A. and remains sole master of the field. But when all the world was unoccupied, when there was but one species existing, say a fern on the land, or a trilobite in the waters, there could be no push or competition for place or position, there could be no "struggle for life." The tragic existence of murderous selfishness,

which is supposed in the theory to be the destiny of every living organized being, could not then be known on the earth. If there were a new species of trilobite produced, and we know very well that there were many, and that they co-existed in perfect harmony, there could be no reason for the new species exterminating the old. The circumstances which Mr. Darwin imagines make the struggle for life a necessity now did not then exist; the world was empty; earth, air, and water, unoccupied, were waiting for organized beings; and the untenanted globe, with all its vast surface, could offer to the first new creatures an almost infinite domain.

Supposing, however, for argument's sake, that B. was introduced by natural selection, we know that its appearance must imply the extermination of A., for natural selection is in fact nothing but improved organization pushing out of existence the unimproved competitor.* Let us, then, grant that an independent, accidental B. had made its appearance, then, of course, A. has been exterminated! So, then, *the first and the only created form in the world was exterminated*, the single work of the Creator was destroyed, and Natural Selection took into her hands the task of the rest of creation, which SHE accomplished with superior skill and power. If, then, Mr. Darwin has introduced the Creator on the stage for the first form, he has soon cleared away the stage and brought other actors on the scene of a widely different character. Who, however, can accept such speculations? who can even contemplate them with patience? The first form of life represented as an act of divine power, but the second the result of accident—"variations might be beneficial." So, then, the Creator close at hand, who had, as it were only yesterday, made the first organized being, is heard of and seen no more, and in His place blind matter, without intellect or power of action, makes a new form, because "it would be beneficial," though there was neither mind to perceive that it would be beneficial, nor volition to desire it, nor power to make the requisite transformation.

This plan, however, requires another consideration, for it is obvious that according to this scheme of life the existence of more than one organized being could not be effected. Let us return to our alphabet to see this. B. is master of the position by having exterminated A.;

* "All organic beings are striving to seize on each place in the economy of nature; if any one species does not become modified and improved in a corresponding degree with its competitors it will soon be exterminated" (p. 107).

but if another "differentiation" is to take place, that is, if another being is to be produced by natural selection, the same tragical occurrence must be repeated, and, in order to effect the existence of C., there must be an extermination of B. We should then have C., the only form of life after the lapse of infinite ages. The same rule would hold good through all the alphabet,—the successful letter would have always exterminated its predecessor,—and by this time, following the rule of natural selection, we should have only one living species on the face of the earth! Such is the dilemma into which this theory has brought its learned author, who, in order to account for the existence of organized beings by transmutation from one to another, has, in securing that object, given us one created spore and one uncreated species to possess the whole earth after thousands of millions of ages. Such, then, is the theory, with its contradictions, perplexities, and self-refutations, proposed to us as something far more reasonable and scientific than the received opinion, which holds that creation was manifold, that all the forms of life which infinite wisdom saw to be fit for the conditions of existence were, by an act of divine power, called into being, and to use Mr. Darwin's words of a wiser era, were *made by one hand*. Whatever, therefore, may be the skill with which various expedients have been devised by the author to parry the difficulties which his theory had to encounter, it is manifest that in the one great point to be established,—that upon which everything depends,—there has been a total failure.

The whole theory is expressed in the title-page of the book, 'The Origin of Species by Means of Natural Selection; or, the Preservation of Favoured Races in the Struggle for Life.' We have here more closely examined "the origin," and we find when we approach it—

1. That the author says all speculations on the subject would be baseless and useless, which is, in fact, giving up the question.

2. That notwithstanding this formal surrender of the question, there are two origins of species proposed; the first form which was created and vivified by divine power, and after that progenitors of species produced by natural selection.

3. The first form does not allow life to advance, and confutes itself.

4. The first form vitiates the whole theory, and introduces a principle which natural selection was intended to discard. If creation be admitted at all, creation cannot afterwards be excluded.

5. The progenitors of species are impossible figments of the imagination, which never can have existed.

6. In every aspect, then, the origin of species, as explained by Mr. Darwin, is "baseless."* This is his own sentence on his own theory, and in this view of the case most persons, after a candid examination of it will be disposed cordially to agree with the learned author. (From 'The Darwinian Theory of the Origin of Species Examined, by a Graduate of the University of Cambridge,' pp. 11–16.)

MIMICRY IN NATURE.

The few remarks on so-called "Mimicry in Nature," which I introduced in my new work on Central America, particularly relate to the predominance of the Willow form on river-banks. It is almost unnecessary to say that in the work from which the extract is taken it was undesirable to insert more than a few names in support of my observations, but it might not be difficult to show that most plants bearing leaves of a true Willow form do grow by running streams. To say nothing of those species of *Salix* having Willow leaves (or those *Salices* not having Willow leaves, and not growing by running streams, *S. herbacea*, etc.) I would remind you of the different species of *Nerium* (Oleander), our *Epilobium angustifolium* (*vulgo*, Willow herb), *Lythrum Salicaria*, etc. That some plants are found by rivers which do not have Willow leaves (as pointed out) has, in my opinion, nothing to do with the question, how it comes to pass that the Willow form predominates to so great an extent in such localities. The answer may be very simple, but at present it has not come forth. About the term "mimicry" there should be a clear understanding. It is, so far, a thoroughly objectionable one, as by employing it either in zoology or botany, the whole question is prejudged; indeed, it is assumed—1. That organisms have the power to mimic other organisms; and 2. That they have come in contact with those organisms which they are supposed to mimic. Employ the terms "outer resemblance" instead of mimicry, and we are on neutral, undisputed ground. The subject

* If speculation on the first differentiation of species is baseless and useless, then the deduction is inevitable that the main question of the theory cannot be established on any base.

of these external resemblances of species and whole genera to others having an entirely different organic structure, is a wide and complicated one; and I think that the best way to approach it is to go through the whole vegetable kingdom, and take note of every case where the outer features of one species or genus are reflected in any other. Some years ago my late lamented friend, Dr. Schultz-Bipontinus, read a paper on his favourite Order, the *Compositæ*, in which he pointed out that in this, the largest of all Phanerogamous Orders, the habit of almost every other Order of the vegetable kingdom cropped up again. In *Euphorbiaceæ*, and other large Orders, similar instances are noted. Sometimes this outer resemblance is perfectly startling. I remember finding a Sandwich Island plant, which looked for all the world like *Thomasia solanacea* of New Holland, a well-known *Buettneriacea* of our gardens, but which on closer examination turned out to be a variety of *Solanum Nelsoni;* the resemblance between these two widely separated plants being quite as striking as that pointed out in Bates's 'Travels on the Amazon,' between a certain moth and a humming-bird. This outer resemblance between plants of different genera and Orders has played us botanists many a trick, and is one of the many causes of the existence of some almost incomprehensible synonyms in our systematic works. Wendland in his monograph on Acacia described many good species, and thought he knew an Acacia when he saw one; yet one of his new ones (*A. dolabriformis*) which he referred to the genus from habit alone, turned out to be a *Daviesia*. Few men had a better knowledge of Ferns than Kunze, yet "mimicry," Puck-like, played him a trick when, relying on the nature of the leaf and venation, he referred *Stangeria paradoxa*, a Cycad, to true Ferns; and Sir W. J. Hooker, good botanist as he was, would never have figured a *Veronica* as a Conifer, if "mimicry,"—using the term for the last time—had not been at play. At present I have no theory to propose on this subject, but whoever has, ought to both bear in mind that it must apply with equal force to the animal and vegetable kingdoms, and that to say that these resemblances are merely accidental, counts for nothing until it shall have been proved that there are such things as "accidents in nature." (Berthold Seemann, in Gard. Chronicle.)

CORRESPONDENCE.

Supplement to the List of Trees of Australia.

In a volume published on the results of the intercolonial Exhibition of Victoria, an index was given of 950 trees ascertained to exist in Australia. During last year, discoveries, especially in Queensland, have furnished material for a short supplement to the lists, the species being either new or not formerly known to attain the height of trees. The letters following the scientific name indicate the name of the colonies in which the trees are found.

Melodorum Maccraei. Ql.
Pittosporum rubiginosum. Ql.
Eriostemon squameus. V., T.
Sterculia laurifolia. Ql.
Sloanea Woollsii, N. S. W.
Sloanea Macbrydei. Ql.
Gomphandra Australiana. Ql.
Beyera viscosa. T., V., N. S. W.
Oxylobium callistachys. W. A.
Pithecolobium Sutherlandi. Ql.
Quintinia Fawkneri. Ql.
Cuttsia viburnea. N. S. W.
Carnarvonia aralifolia. Ql.
Dryandra floribunda. W. A.
Myrsine achradifolia. Ql.
Bassia galactodendron. Ql.
Chrysophyllum pruniferum. Ql.
Chrysophyllum Myrsinodendron. Ql.
Alstonia villosa. Ql.
Alstonia excelsa. N. A.
Cerbera Odollam. N. A., Ql.
Casuarina Fraseriana. W. A.

FERD. VON MUELLER.

Melbourne Botanic Garden, April 24, 1868.

A List of Andover Plants.

I have been surprised to see that a very humble botanical essay of mine, 'A List of Andover Plants,' has called forth in the Journal of February, 1867, a rather long criticism from H. C. W. I wish to make some reply to that criticism.

H. C. W. commences by quoting some shreds of my short sketch of the physical geography of the Andover district, and proceeds :—"The information thus epitomized here is expanded into a geological disquisition in the book." The geological disquisition occupies less than five loosely printed pages, and it is not expanded out of the information epitomized by H. C. W.

H. C. W. next accuses me of inconsistency in describing the Andover flora as a typical chalk one, while afterwards I have put forward reasons for supposing that certain of the superficial clays hitherto referred to later eras are probably true Woolwich and Reading beds. Does H. C. W. suppose that there is to be found a centre in England from which a radius of five to ten miles will not include many superficial clays and valley gravels? It is unnecessary to argue that the neighbourhood of Andover is a thoroughly chalk area, for no person who has travelled from Basingstoke to Salisbury by rail will dispute the fact, and such traveller may also see in a very few cuttings a reddish-purple clay. Whether the clay be considered Lower Eocene or more modern will not affect the general cretaceous character of the district. I must remark here

that H. C. W. states generally that my own alleged facts (sometimes) directly contradict my most emphatic assertions, but gives no instances unless the present and another equally trivial one concerning the determination of a doubtful specimen marked *Lastrea cristata?* are to be considered as such.

Next, H. C. W. quotes and criticizes my summary of reasons for adapting my list of Andover plants to Babington's text book, or, as it should have been quoted, to Babington's among other text books. My reasons for adapting the list to *a* text book are stated separately, and are distinct. H. C. W. remarks that "differences might be just as well known and much better announced without making bad species founded thereon." To which there is the obvious and old reply, that though they might be they sometimes are not. But, further, I have not asserted the contrary proposition to that of H. C. W.; I have merely remarked that an observer may call attention to a very important fact, though at the same time he makes a very bad species. H. C. W.'s next paragraph is directed against "repetitions of matter sufficiently well known," from which a hasty reader might infer that he brings that charge against me. But it is not at all clear that he does. H. C. W. several times employs the artifice of defeating arguments which I have not advanced, and at the same time avoids committing himself to any direct expression of opinion in opposition to mine. He is severe on my definition of 'indigenous,' but he suggests no better; he says my theory, that the fertile fronds in *Lastrea Oreopteris*, etc., do not exhibit the full development of the pinnules, is opposed to received notions, and scoffs at it a little, but he does not say that he thinks it wrong after all.

The next part (a large one) of H. C. W.'s criticism is occupied with an explanation of the method adopted in the 'Cybele Britannica,' and a vindication of its accuracy. I have nothing to object to this. In the 'Andover List' I have described the 'Cybele Britannica' as "the most elaborate and carefully prepared abstract of geographical distribution extant, founded on unusually numerous observations, and corrected by great local experience on the part of the compiler. . . ." This, perhaps, might have been expected to satisfy H. C. W. But I committed the grave crime of reducing my list by the standard of Babington's 'Handbook' instead of by the 'London Catalogue.' The question before me was "whether the advantage proposed to be gained by the reference of all local British Floras to the 'London Catalogue' would counterbalance the advantages of reference to a manual." This is the real issue between H. C. W. and myself, which he avoids by summarily declaring my arguments on that point to be wholly irrelevant. This any person who wishes to take the trouble of reading the introduction to the 'Andover List' can judge for himself, but I may be permitted to state that one or two persons *almost* as well qualified to judge as H. C. W. have not thought them irrelevant.

The next point in H. C. W.'s criticism is very extraordinary to me. The definition of the word 'indigenous' is generally avoided by cautious old botanists. In books there appears a great difference of opinion between botanists of eminence in the case of many plants, whether they are to be considered indigenous or no. It has seemed to me that these apparent differences are in a great

measure due to botanists not attaching the same idea to the word 'indigenous,' and I have also found it useless to determine by authority whether a plant is to be considered indigenous or not for the same reason. I was of course compelled to mark plants as indigenous or introduced in the Andover district by my own guesses, and I thought it much better to tell my readers from what premises I made the guess. I accordingly defined—"By an indigenous plant I mean a plant which I should expect to meet with if I were transported backwards to the period immediately before agriculture was commenced." This definition is held up by H. C. W. as the most flagrant instance of my egotism, of the three I. I. I. This piece of criticism is simply beyond my comprehension. I am aware that the word 'I' occurs three times in the above definition, and occurs steadily through the 'Andover List,' because, firstly, writing in the first person is shorter and more distinct than writing in the third, and because, secondly, I should like to see in all scientific writing a little more honest expression of personal opinion, and a little less of sentences commencing, "We may suppose that," "It has been objected, and apparently with reason," etc. After all, the mannerism adopted in an introduction is of little importance to the usefulness of a list such as the 'Andover List,' which must depend upon its accuracy and especially on the exclusion of species mistakenly named. I am sorry that H. C. W. has not employed more of his space in criticizing the list itself, as I should without doubt gain much by his hints for my second edition. To take H. C. W.'s remarks in detailed order:—

Ophrys apifera does grow in the district, viz. in the church meadow at Hurstborne Priors, also near the bridge in Hurstborne Park. These localities were sent me within a short time after the printing of the 'Andover List,' by C. Lockhart, Esq., who also at the same time sent me much other information. I mention this to encourage others to publish local Floras or anything of the kind they can. I had collected for years in Mr. Lockhart's parish, and yet never suspected that I had a brother botanist within twenty miles till I printed the 'Andover List.'

Aceras anthropophora, I have little doubt, grows on some of the steep downs close round Hurstborne Terrant, but as I have never found it myself, neither has any botanist reported his finding it, neither has any unskilled botanist brought me a specimen,—I have, on the rule laid down in my introduction, entirely omitted it from my list.

It appears thus that H. C. W. is right in his suspicions that these plants grow in the district and have escaped me. I have intimated in the introduction to my list, and indeed in my very title, that such would be found to be the case.

Mimulus luteus I have no doubt is introduced in Hampshire. The word 'introduced' is omitted after it by mistake, as H. C. W. suggests. I had written and re-written a note on it, but as it did not concern *Mimulus luteus* as a Hampshire plant, I finally cut it out and forgot to insert 'introduced.' I saw some years ago on the side of Loch Scavaig, in Skye, banks of *Mimulus luteus*, such that with a scythe and pitchfork one might have speedily loaded a cart therewith. The improbability of its being a mere escape in so desert a

locality, and if so of its growing so freely in a deep bog, is clearly considerable. *Eriocaulon* is admitted a British native. It is equally difficult to prove that *Mimulus luteus* did or did not exist in the Western Isles before the discovery of America. The indigenousness of so fine an addition to the British flora by British botanists ought hardly to be surrendered without a struggle.

Lastrea cristata is marked in the list with a note of interrogation. I am obliged to H. C. W. for his suggestion that my specimens may be merely *L. spinulosa*, and will another day re-examine them under this light.

Aconitum Napellus, *Silene Armeria*, *Papaver somniferum*, *Œnothera biennis*, the insertion of which in the list is objected to by H. C. W., are each there marked "ballast plants." They did not appear as casual escapes as H. C. W. supposes, but in great quantity in the bed of the old canal when the water was drained off. *Œnothera biennis* in particular extended continuously several miles and grew in masses.

Gnaphalium luteo-album and *Carex aquatilis*, "confidently discarded" by H. C. W., are both marked with a note of interrogation in the list. I have a specimen of the first which, I think, if shown to H. C. W., would probably shake his confidence so far as that the plant had never been collected in the district. As to my specimens of *Carex aquatilis*, they have puzzled several botanists, and are fully described in the 'Andover List.' H. C. W. is doubtless correct in thinking it extremely improbable that the true *Carex aquatilis* is to be found in North Hampshire. I have not asserted that it is.

Rumex obtusifolius is marked with a note of interrogation, not because I doubt whether botanists in general would so name it, but because (as stated in the note in the 'Andover List') I doubt whether it is not a variety from the type whence Professor Babington has drawn his description of *Rumex obtusifolius*.

Salix capræa, is no doubt, correctly named, but I have never seen it in blossom in the district, and I am far too imperfectly learned in the species of Willow to say absolutely that I had found *Salix capræa* from comparison of a branch and summer leaves only.

To sum up, the only positive error which so able and so unfriendly a critic as H. C. W. has detected in the 'Andover List,' is the omission of 'introduced' after *Mimulus luteus*. If I could hope (which I do not) that H. C. W. has hit all the blots, I should confidently assert that a more accurate botanical list was never published.

I have now, I believe, run over all the disputed points. I have, of course, not presumed to take up your space in making any reply to what may be called his *badinage*. It has been my fate on more than one occasion to print arguments, and to be met in reply merely with objections to my style, lamentations over my tone, even criticisms of my English. I hope, for H. C. W.'s credit, as well as for my own profit, that the next time he has to take me in hand he will stick to the style which becomes him best, viz. the scientific style.

C. B. Clarke.

Dacca (East Indies), 15th January, 1868.

MEMORANDA.

SACRED PLANTS OF THE ANCIENT TEUTONIC PEOPLE.—Much might be written on the sacred characters of certain plants and flowers amongst the ancient Teutonic nations. They were either dedicated to the gods or they bore the names of gods, as for instance, Donnerbart (*i. e.* the Beard of Donar, God of Thunder) = *Sempervivum tectorum*, which was planted on roofs as a protection against lightning [and still is in Switzerland—EDITOR]; Baldrsbrâ (*i. e.* the Brow of Baldr), which was either *Anthemis Cotula* (at present called "Balsensbro" in Schonen and "Barbrogräs" in Denmark), or *Matricaria maritima* (*inodora*), which to this day bears the ancient name in Iceland; Loken's Havre (*i. e.* Loki's Oats), identified by some with *Avena fatua*, by others with *Rhinanthus Crista-galli*, a weed, injurious to cattle, and believed to be sown by the mischief-loving god Loki; Friggjargras (Freygà = Venus's-grass) or Frionagras (*herba conjugalis*) our *Orchis odoratissima*, to which aphrodisiac properties were ascribed, etc. Some of these sacred plants were supposed to have originated in the transformation of oppressed, dying persons, and nearly all were believed to possess either beneficial or injurious properties and influences; but, in order to bring them into play, it was held necessary to gather the plants themselves. Hence, as was the case with the protecting sacred animals, they were adopted by different countries, towns, and heroes in their coats of arms. Thus, amongst the Friesians and Seelanders, the Water-Lily was from the earliest times an object of veneration. The Dutch call it "*Plompe*," the Friesians "*Pompe*;" correctly speaking, the broad leaves floating on lakes are the "*Pompelbladen*," and the white scented flowers "*Swanneblommen*" (*flores cygnei*), which reminds us of "Nixblume,"* "Näckblad," "Muhme," and "Mummel," treated of elsewhere. The Friesians have seven leaves of the Water-Lily in their coat of arms, and believe themselves to be victorious when fighting under this emblem,—a fact mentioned as early as 1373, in the 'Gudrunlied,' where Hernic von Sêrven or Selander is spoken of as carrying a blue flag with the leaves of the Water-Lily as an emblem. J. H. Halbertsma ('Het Buddisme en zijn stichter;' Deventer, 1843, pp. 3, 10) adds that to this day the Dutch are very careful in plucking and carrying the Water-Lily. Whoever, when holding this flower in his hand, happens to fall, will get epilepsy. One of the same kind of plants is the sacred Lotus of ancient Egypt, which is also worshipped in India, and before which Tibetians and Nepalese bow their heads; it is placed in the the temples, and Brahma and Vishnu float on its leaves. Curiously enough the ancient Dutch poem of 'Brandaën' describes how the hero met on the lake a man, not larger than a thumb, who was floating on a leaf, having in his right hand a cup, in his left a rod which he put into the lake to fill the cup with the water adhering to it, upon which he untied the cup and commenced the task anew; this he had to do till the end of time. (Grimm, 'Deutsche Mythologie,' vol. i., ii.)

* *Nix-blume* = Nick's flower; Nick, "Old Nick" being originally a water-spirit = Neptune.

NEW PUBLICATIONS.

Synopsis Filicum. By the late Sir WILLIAM J. HOOKER, K.H., etc., and J. G. BAKER, F.L.S. 8vo. London: Hardwicke.

This volume being a synopsis of the late Sir William Hooker's great work, 'Species Filicum,' will be welcome to every lover and student of Ferns; if it had been permitted to him, to accomplish himself, what has been so well done by the present author, we should say that his performance would stand almost alone in botanical literature, and that Sir William would have left us a monument of labour and learning such as few other men could boast of. As it is, we have here the result of nearly thirty years' untired labour compressed in about five hundred pages, with some useful plates indicating the main features of all the genera, and an enumeration and brief description of all clearly recorded species of Ferns, together with an excellent index, greatly facilitating references.

Whilst Hooker carried out his 'Species Filicum' his own views naturally became liable to change, and hence some alterations are to be noticed in this Synopsis. What Hooker called tribes are now styled suborders, and what he designated as suborders are named tribes. *Hymenophyllum* and *Trichomanes* have been separated from *Dicksonieæ*, and constitute a separate tribe; hence, instead of twelve tribes (formerly suborders) the Polypodiaceous or second suborder has been divided into thirteen tribes. These have been reduced from sixty-six to sixty-one genera. All doubtful species have been omitted, and some new but well-established species have been admitted, the whole (including some additions, of which presently) now amounting to 2235 against 2380 in the 'Species Filicum.' *Lomaria*, formerly considered to belong to *Blechneæ*, has been ranged under *Pterideæ*, to which alteration Hooker seemed already inclined, though he left the customary arrangement undisturbed.* Mr. Baker has also fulfilled the promise of Hooker by adding the following suborders, the enumeration of which will be welcome to every labourer in this field of inquiry, viz.:

* It is unnecessary here to indicate several minor cases of transposition from one subdivision to another; they are by no means as numerous as amongst so many subjects and diversities of opinion might have been expected, and form an additional testimony of Sir William Hooker's great care and sagacity displayed in the original work.

Suborder III. *Osmundaceæ.* Genus 62, *Osmunda.* Genus 63, *Todea.*
,, IV. *Schizæaceæ.* Genus 64, *Schizæa.* Genus 65, *Anemia.* Genus 66, *Mohria.* Genus 67, *Trochanteris.* Genus 68, *Lygodium.*
,, V. *Marattiaceæ.* Genus 69, *Angiopteris.* Genus 70, *Marattia.* Genus 71, *Danæa.* Genus 72, *Kaulfussia.*
,, VI. *Ophioglosseæ.* Genus 73, *Ophioglossum.* Genus 74, *Helminthostachys.* Genus 75, *Botrychium.*

In all, four suborders, containing 14 genera and 107 species, thus raising the total number of genera to 75 and that of species to the figure already indicated.

It only remains to add, that this Synopsis will be found to answer every purpose of the earnest inquirer, and will for years to come serve as the best handbook of Ferns; and that we owe a great obligation to Mr. Baker for having carried out so soon and in so perfect a way the wishes of Hooker and the wants and expectations of the lovers of these plants.

Index to the Native and Scientific Names of Indian and other Eastern Economic Plants and Products. Prepared by J. Forbes Watson, M.A., M.D., F.L.S., etc. London: India Museum, 1868. 8vo. pp. 637.

This compilation from the numerous separate works, memoirs in journals and transactions, and ephemeral catalogues, referring to the vegetable products of Asia, from Japan to Arabia, carries out the ideas first advocated in Seemann's 'Popular Nomenclature of the American Flora,' where the employment of vernacular names in botany was shown to be practical and useful. Nearly a hundred different publications have been consulted, and the native names contained in them arranged in one continuous alphabetical index. The spelling employed by each author is retained, so that the same word applied to the same plant is frequently repeated, because of slight modification in the spelling. As the arbitrary though uniform spelling of the "Fonetik Nuz" has not been and is not likely to be adopted, we have no prospect of obtaining a recognized standard in spelling, and perhaps the better plan — although involving repetition—is to follow that adopted.

The native name is followed by the scientific, given on the authority of the author quoted, whose work is referred to, and this not only enables the person consulting the Index to confirm the reference, but gives him also a key to works where he will obtain information regarding the objects he is investigating. Our experience is that native names, when correctly ascertained, are very constant in their value. Practically, then, this Index will be of value to botanists dealing with the pure science, and much more to those investigating the history of plants applied by the Eastern nations to economical or officinal purposes. It would be a valuable companion volume if Dr. Watson were to prepare, on the plan suggested in the work above referred to, a scientific list of the plants, with their native names, in the various regions where these have been recorded.

BOTANICAL NEWS.

The Committee of the International Horticultural Exhibition having offered to invest the balance of the profits realized by that Exhibition (over £1850, after presenting £1000 to the Gardeners' Benevolent Institution) in the purchase of books to form a library in connection with the Royal Horticultural Society, and to be called the "Lindley Library," in testimony of the respect in which the late Dr. Lindley's memory is held, on the condition that the books so purchased, and any others which might hereafter be presented, should be vested in seven trustees, and that the books should, under rules, be available for the use of the Fellows of the Society and other horticultural students,—the Council agreed to accept the offer, and appointed three trustees; and the International Committee appointed Dr. Hogg, Dr. Maxwell Masters, and Thomas Moore, Esq., to represent them; and the six having agreed, nominated Sir C. Wentworth Dilke, Bart., M.P., as the seventh, and the trust-deed has this day (May 5, 1868) been signed. The first purchase made by the trustees is Dr. Lindley's Botanical and Horticultural Library, at a cost of £600, and steps are being taken to make the library available.

Antigonon leptopus, a very singular Polygonea, from the north-west coast of tropical America, has been introduced by Mr. Bull, of Chelsea, and is held to be one of the most beautiful climbers in existence, the natives of Mexico and Nicaragua terming it *Rosa de Mayito* and *Rosa de Montana*, in allusion to its beautiful rose-coloured flowers.

The very useful publication, 'Annales Botanices Systematicæ,' has again appeared, the first fasciculus of the seventh volume, by Carl Mueller, of Berlin, having just been issued. It is to contain the additions to botanical literature which have accumulated from 1856 to 1866. The present fasciculus of 160

pages extends from *Ranunculaceæ* to *Lepidineæ*, the sixth tribe of the *Cruciferæ*. It is to be desired that the printing and issue of a reference book like this, which starts a year at least in arrear, should be expedited as much as possible.

The tablet to the memory of Sir Joseph Banks, which the good feeling of Dr. J. E. Gray prompted him to erect in the church at Heston, near Hounslow, bears the following inscription:—

"In this church is buried
THE RIGHT HON. SIR JOSEPH BANKS, BART., C.B.,
President of the Royal Society
from 1778 to 1820.
He died at Spring Grove, on the 19th of June, 1820,
aged seventy-seven years."

It is not a little singular, says the 'Gardeners' Chronicle,' that no previous memorial should have existed in the church of the parish in which Sir Joseph's property was situated, and in which he was interred.

We regret to announce the death of our esteemed contributor Nathaniel Bagshaw Ward, F.R.S., F.L.S., which took place on the 4th of June, at St. Leonard's. Mr. Ward was the son of Stephen Smith Ward, a medical practitioner in the east end of London, and was born in 1791. Early exhibiting a taste for natural history and foreign travel, his father gratified it by sending him, when only thirteen years of age, to Jamaica, where the splendid tropical scenery and the animal and vegetable productions made an impression on his mind which was never to be effaced. On his return to London he devoted himself to the medical career, and soon obtained a considerable practice. Botany was always one of Mr. Ward's favourite studies, and his suburban house was always well stocked with plants of all sorts. The disappointments which he experienced in their cultivation in the smoky atmosphere of London, led to the invention of those closed glazed cases which bear his name, and by means of which our gardens have been considerably enriched, and the most distant parts of the globe stocked with more useful plants within the last thirty years than they had been since a more intimate intercourse began to prevail amongst nations. This invention was first made known in 1836 in the 'Companion of the Botanical Magazine,' and fuller details of it were given in Mr. Ward's work 'On the Growth of Plants in Closed Glazed Cases.' Mr. Ward gave frequent *soirées*, at which the microscope and its revelations were the prominent features, and out of these sprang the Microscopical Society. Through the greater part of his life Mr. Ward was associated with the Apothecaries' Society of London, first in connection with their gardens at Chelsea, then as examiner for the prizes in botany, then as master, and ultimately as treasurer. He died in his seventy-seventh year, much regretted by a large number of friends.

George A. Walker Arnott, Regius Professor of Botany in the University of Glasgow, died on the 17th of June. He was a native of Edenshead, on the borders of Fife and Kinross. He was educated at the High School and

the University of Edinburgh, and obtained a high standing in the latter for his acquirements both in languages and mathematics. In 1821 he was admitted a member of the faculty of advocates, but his dislike to public speaking was so great that he is said to have appeared in the gown only thrice. His fondness for botany was early developed, and was subsequently converted into a life-long passion by his visits to France in 1822 and 1825, and his intercourse with the great French botanists whose lectures and herbaria he frequented, and whose botanical excursions he shared. One of his earliest botanical papers, "On some Mosses from Rio Janeiro," written in French, appeared in a Paris journal in 1823. In 1825 he made a tour to the south of France and the Pyrenees, in company with Mr. Bentham, the results of which are recorded in an interesting narrative in the 'Edinburgh New Philosophical Journal' of 1826–7. From Paris he afterwards proceeded to Geneva, where the great herbarium of De Candolle furnished him with fresh opportunities of study. At a later period he visited Russia, and acquired during his residence there considerable knowledge of the Russian language. In 1837 King's College, Aberdeen, conferred on him the degree of LL.D., and in 1845 he received the appointment of Professor of Botany in Glasgow. Of his larger works we may mention the 'Prodromus Floræ Indiæ Orientalis,' prepared in conjunction with Dr. Wight; his monograph of the Indian Cyperaceæ; his 'Botany of Beechey's Voyage,' and his 'Contributions to the Flora of South America and the Islands of the Pacific,' along with Sir William Hooker; the article "Botany," in the seventh edition of the 'Encyclopædia Britannica;' and the well-known 'British Flora of Hooker and Arnott,' which has passed through nine editions. For some years he had devoted himself entirely to the study of *Diatomaceæ*. His extensive acquaintance with the minute plants which compose this Order, and his exact critical knowledge of the species, were very remarkable, and unsurpassed among any of his contemporaries. He contributed to the Journal of the Microscopical Society a few papers on some of the more remarkable genera, but he was always disinclined to publish. It is, however, fortunate for science that he did not keep his knowledge to himself. He was ever ready to communicate whatever he observed, and the marvellous letters which he found time to write to his numerous working correspondents, have made these observations nearly as useful in science as if they had been published. The exact and detailed labels which are attached to the slides of his immense collection of *Diatomaceæ*, also permanently record many of his important observations. It is to be hoped that this collection will become the property of some public institution where it may be accessible to students. As a professor, he was much respected and esteemed by all his students; as a botanist, his careful habits of observation, and minute accuracy of description, render his works peculiarly valuable.

A.Schmidt, del. W.Fitch. Lith.

ENUMERATION OF THE LABIATÆ AND SCROPHULARINEÆ, COLLECTED DURING THE YEARS 1855–1857 IN HIGH ASIA AND THE NEIGHBOURING COUNTRIES TO THE SOUTH, BY MESSRS. ADOLPHE AND ROBERT HERMANN DE SCHLAGINTWEIT.

By Dr. T. A. Schmidt.

(Plate LXXXII.)

(As Dr. Klatt recently published, in this Journal (Vol. VI. p. 116), the *Primulaceæ*, *Pittosporeæ*, and *Irideæ*, collected by Messrs. De Schlagintweit,* and, as he gave on that occasion some details about the topography of the country in which this herbarium was made, especially the mountain systems of High Asia, communicated to him by Mr. Hermann de Schlagintweit-Sakünlünski, I shall add, in the present paper, merely a few geographical data respecting the different species.)

Indian plants, pretty numerous in these Natural Orders, are chiefly collected in the eastern regions of India, Assam, and the Khassia hills, partly also in the Panjab,—territories most important for comparison with High Asia. The principal features of High Asia, the reader may be reminded, are its three mountain-chains, described in Dr. Klatt's paper. The *southern slopes of the Himalaya* have been divided into three parts,—the eastern, the central, and the western; the latter, having been crossed by the three travellers, by many different routes, and being less excessive in moisture than the regions more to the east, furnished the greatest mass of materials of the present collection. The *Karakorum*, the northern border of the vast Tibetan longitudinal valley, notwithstanding its dryness and elevation, also contributed interesting materials from its southern slopes, (those towards Tibet); but the plateaux on its northern side, towards the third chain of High Asia, the *Künlün*, are very little represented in the Natural Orders here enumerated.†

* Previous to that there had appeared:—"Notice sur les Polygonées, les Thymélées et les Laurinées," par C. F. Meissner, 'Annales des Sciences Naturelles,' sér. v. tome vi. cahier 1–27; and Grisebach, "Ueber die Gramineen Hochasiens," 'Göttinger Nachrichten,' February, 1868, p. 61–93. Grisebach's paper included all the material at Kew, duplicate specimens of which were kindly presented by Dr. Hooker.

† The *Gramineæ*, on the contrary, showed no appreciable difference between the Highlands of Tibet and those of Turkistan.

The heights are given in English feet, and the spelling of the geographical names is that adopted by the travellers in their large work.*

The following tables show the local distribution of the species. The new species are marked with a cross (+), the new varieties with an asterisk (*).

A. Labiatæ.

Genera.	Number of Species.	Geographical Distribution of the Species.		
		Khassia Hills and Subtropical India.	Himalaya.	Tibet.
Ocimum	2	2	2*	
Plectranthus	1	...	1	
Pogostemon	2	2	1	
Dysophylla	1	1	...	
Colebrookia	1	...	1	
Elsholtzia	4	...	4	1
Perilla	1	...	1	...
Mentha	3	1*	2**	1
Lycopus	1	...	1	
Origanum	3	...	3+*	
Thymus	1	...	1	1
Micromeria	1	...	1	
Calamintha	2	...	2	1
Perowskia	1	...	...	1
Salvia	6	1	5	1
Nepeta	13	...	9	7+
Dracocephalum	4	...	1	3
Prunella	1	...	1	1
Scutellaria	3	...	3	
Marrubium	1	...	1	
Craniotome	1	...	1	
Anisomeles	1	1		
Stachys	4	...	4	
Leonurus	2	1	1	
Lamium	4	...	3	1
Leucas	3	1	2	
Leonotis	1	1		
Phlomis	2	1	2	
Gomphostomum	3	1	2	
Teucrium	3	...	3	
Holmskioldia	1	1	1	
Total	77	14	59	18

* 'Results of a Scientific Mission to India and High Asia,' vol. iii. The vowels, with few deviations, are pronounced as in Italian; the consonants as in English. Full details are given l. c. pp. 148–161, but in this paper necessarily omitted.

B. Scrophularineæ.

Genera.	Number of Species.	Geographical Distribution of the Species.		
		Khassia Hills and Subtropical India.	Himalaya.	Tibet.
Verbascum	3	...	2	1
Antirrhinum	1	1		
Scrophularia	2	...	2	
Alectra	1	1		
Doratanthera	1	1		
Lindenbergia	1	2		
Stemodia	1	1		
Limnophila	2	1	1	
Herpestes	1	...	1	
Torenia	3	2	1	
Vandellia	1	1		
Bonnaya	1	1		
Buddleia	4	4 +	1*	
Digitalis	1	...	1	
Picrorhiza	1	...	1	
Wulfenia	1	...	1	
Veronica	8	4	5	4*
Striga	1	1		
Sopubia	1	...	...	1
Odontites	1	...	...	1
Euphrasia	1	...	1	1
Pedicularis	10	...	5	6
Total	48	20	22	15

New Species and Varieties.—Respecting the three new species described, two of which are here figured, Mr. Hermann de Schlagintweit has communicated to me the following data :—

"*Origanum Watsoni*, n. sp., was found in the dominions of the King of Kashmir, on the route from Kishtvar to Islamabad, a part of the southern slopes of the Himalaya where the general elevation does not attain a very great height ; the Kishtvar peak, one of the principal mountains near the eastern sources of the Chinab, reaches 16,662 feet.* As to climate, the region of 6000 to 8000 feet in Kishtvar, may best be compared to that of Montpellier, in Europe ;† the annual

* See 'Results,' vol. ii. p. 393, and 'Atlas, Nunevara Panorama,' plate iii. of the "Panoramic Profiles."

† 'Results,' vol. iv. p. 515.

mean resulting from my researches for Dalhousie in Chamba, height 6850 feet, being 59·30°, that of Montpellier 59·5° F. With reference to daily and annual variation, the climate all over Kashmir is mild, and not too hot. The decrease of temperature with height, for this part of the Himalaya, is 410 feet for 1° F."*

Acting on the suggestion of the traveller, I name this new species in honour of Dr. T. Forbes Watson, M.A., M.D., F.L.S., Reporter on the Products of India to the Secretary of State for India ('Index to the Native and Scientific Names of India and other Eastern Economic Plants and Products,' London, 1866, etc. etc.), and various other important contributions to Indian botany.

"*Nepeta Sabinei*, n. sp., has been met with, by my brother Adolphe, in Western Tibet, at 15,800 feet† on the Thale La Pass, in Balti, and, a second time, at 12,592 feet, on the Gue Pass. For the thermal conditions in Balti, at this height, we obtain from my general tables the following mean values for the seasons and the year:—Winter, 13·5° F.; spring, 54° F.; summer, 30·5° F.; autumn, 34° F.; year, 33° F. In judging of this climate, it must be kept in mind that the dryness, though not quite so excessive as in the regions of Tibet more to the east, is still very great. The illustrious name associated with this plant is that of General Sabine, author of works on terrestrial magnetism of world-wide fame, and for many years President of the London Royal Society. We are especially obliged to him with reference to our Indian researches, for the information we obtained from him personally, and for the pains he took in making the arrangements necessary for our journeys."

"*Buddleia Martii*, n. sp. I found this in the Khassia hills, in autumn, 1855. The height, though important enough to affect the climate materially, did not exceed on this route 4500 feet. The lowest valleys where the plant was found did not descend below 2800 feet. For Cherapunji, the sanitary station for Assam and eastern Bengal, at 4125 feet of elevation, I obtained four years' careful meteorological

* 'Results,' vol. iv. p. 548.

† Though it may be unexpected to meet with such highly developed plants at these heights, the elevation, as such, is nothing extraordinary for these regions. Various *Polygonums* were found at 15,000–17,000 feet, a *Primula*, at 16,905, an *Androsace*, at 16,500 feet,—compare Meissner and Klatt in the paper above quoted. The greatest height at which we met with the last traces of phanerogamic vegetation, was in Tibet, at 19,809 feet.

data, and I add the general means for months, seasons, and years, as by various preceding visits of botanists (amongst which, that of Dr. Hooker ranks as the most important), the vegetation has been much better examined than its distance from Calcutta and the imperfect state of the mode of travelling in the interior might allow us to expect. At the same time the type of vegetation exhibits many new features, —modifications caused by the quantity of rain. Cherapunji and its environs are the most rainy regions of the globe known,* the amount of rain reaching 600 to 620 inches; the rainy season lasts from April to middle or end of October."

"Mean temperature at Cherapunji, lat. 25° 14′ 2″ N., long 91° 40′ 5″ E. Greenw., height 4125 feet.

Jan. . 51·8° F.	April . 63·5° F.	July . 68·5° F.	Oct. . 65·8° F.
Feb. . 54·7°	May . 67·2°	Aug. . 68·1°	Nov. . 58·8°
March . 61·5°	June . 67·1°	Sept. . 67·8°	Dec. . 55·1°
Dec. to Feb. 53·9°	March to May 64·1°	June to Aug. 67·9°	Sept. to Nov. 64·1°

Year . . . . 62·5° F."

"I beg to dedicate this species to Professor von Martius, Privy Councillor and Secretary of the Bavarian Academy, as a token not only of my high esteem of his numerous important works on botany and geography, but also as an expression of sincere gratitude of one of his most devoted pupils."

So far, Mr. Hermann de Schlagintweit, with regard to the new species. New varieties I have to add the following species:—

Ocimum Basilicum, L.; γ. *incisum*, nob. Kashmir.

Mentha Royleana, Benth.; β. *glabrata*, nob. Panjab.

M. Royleana, Benth.; γ. *nervosa*, nob. Kashmir

M. arvensis, L.; *glabriuscula*, nob. Kashmir.

Origanum normale, Don; β. *incanum*, nob. Simla.

O. vulgare, L.; β. *subglabrum*, nob. Kashmir.

Buddleia crispa, Benth.; β. *decipiens*, nob. Simla.

Veronica capitata, Royle; β. *tomentosa*, nob. Tibet.†

* [Query, more rainy than the Bay of Choco, where it rains for eleven months of the year?—Ed. Journ. of Bot.]

† At first this variety appeared to be a new species, which M. Herm. de Schlagintweit, proposed to name after Admiral von Lütke, President of the St. Petersburg Academy.

Systematic Enumeration.

Labiatæ.

1. *Ocimum Basilicum*, L.; De Cand. Prod. xii. p. 31.—*a.* North-western India, province Panjab, environs of Raulpindi, 1900–2600 English feet, 15–28 November, 1856, n. 10,888, 10,908. *b.* Eastern Himalaya, province Sikkim, environs of Darjiling, height 6000–8000 English feet, June to July, 1855, n. 12,426. *c.* Western Himalaya, province Kashmir, drained lake basin of Kashmir, environs of Srinaggar, within a circle of eight miles radius, 2–20 October, 1856, n. 4562; province of Rajaurii Uri, across the Punch Pass *viâ* Kahuta to Punch, 5000–9000 English feet, 6–9 November, 1856, n. 12,161.

Var. *β. pilosum*, Benth. in De Cand. Prod. xii. p. 33.—*a.* Eastern Himalaya, province Sikkim, environs of Darjiling, 6000–8000 English feet, June to July, 1855, n. 12,404; province Assam, Mangeldai to the foot of the Bhutan Himalaya, 100–300 feet, 1 December, 1855, n. 13,506, 13,517. *b.* Western Himalaya, province Kashmir, drained lake basin of Kashmir, environs of Srinaggar, 10 August to 30 September, 1856, n. 4393; province Rajauri, Punch *viâ* Kotli to Islamabad, 4000–2000 feet, 10–15 November, 1856, n. 12,612.

Var. *γ. incisum*, nob.; foliis grosse dentatis incisisve, purpurascentibus, glabriusculis, floralibus ciliatis, calycibus demum glabrescentibus. —*a.* Western Himalaya, province Kashmir, drained lake basin of Kashmir, environs of Srinaggar, 2–20 October, 1856, n. 4521.

2. *Ocimum sanctum*, L.; De Cand. Prod. l. c. p. 38.—*a.* Central India, province Malva, environs of Amarkantak (Paidera and source of the Tohilla), 2000–2900 feet, 26–29 January, 1866, n. 11,881.

1. *Plectranthus rugosus*, Wall.; De Cand. l. c. p. 59.—Western Himalaya, province Kashmir, drained lake basin of Kashmir, environs of Srinaggar, within a circle of eight miles radius, October, 1856, n. 4480; province Garhval, Kharsali *viâ* Rana, down the Tamna valley to Kutnor, 8900–6100 feet, October 1856, n. 9019; province Simla, environs of Simla, 6000–7300 feet, n. 5067; Simla *viâ* Kangra and Jamu to Kashmir, 3000–9000 feet, June to September, 1856, n. 13,274; province Rajauri, Uri across the Punch Pass *viâ* Kahuta to Punch, 5000–9000 feet, November, 1856, n. 12,168; province Marri, Baramula, along both sides of the Thilum valley, down to Mera, 5500–4000 feet, November, 1856, n. 12,410; province Kashmir, Pir Patsaski or Kishtvar Pass to Islamabad, August, 1866, n. 5120.

1. *Pogostemon plectranthoides*, Desf.; De Cand. l. c. p. 151.—*a.* Central India, province Malva, plateau of Amarkantak (source of the Narbada), 21–24 January, 1856, n. 11,863; province Malva, Pendera, foot of Amarkantak *viâ* Schagpur to Ramnagger, 29 January to 11 February, 1856, n. 11,821, 12,744. *b.* Central Himalaya, province Nepal, environs of Kathmandu, 5000–7000 feet, 4–8 March, 1857, n. 13,045.

2. *P. Heyneanus*, Benth.; De Cand. l. c. p. 153.—Eastern India, province Assam, Mangeldai to the foot of the Bhutan Himalaya, 100–300 feet, 1 December, 1855, n. 13,501, 13,515.

1. *Dysophylla quadrifolia*, Benth.; De Cand. l. c. p. 157.—Eastern India, province Khassia, environs of Cherapunji till near Mairong, 2800–4500 feet, October, 1855, n. 334.

1. *Colebrookia oppositifolia*, Smith; De Cand. l. c. p. 158.—Western Himalaya, province Simla, environs of Simla, 6000–7300 feet, 1–20 May, 1856, and 29 March, 10 April, 1856, n. 4851, 4718, 5059.

1. *Elsholtzia flava*, Benth.; De Cand. l. c. p. 160.—Western Himalaya, province Garhval, Gaurikand *viâ* Trijugi Narain, and Maser Tal to Bhillung, 24 September to 3 October, 1855, n. 9540, 9543.

2. *E. polystachya*, Benth.; De Cand. l. c. p. 160.—Western Himalaya, province Garhval, Kharsali *viâ* Rana, down the Tamna valley to Kutnor, height 8900–6100 feet, 14–16 October, 1855, n. 9070; Barkos to Mandrassi, north of the Hill Station, Massuri, 18–22 October, 1855, n. 1018; Gaurikand *viâ* Trijugi Narain and Maser Tal to Bhillung, 24 September to 3 October, 1855, n. 9547; Gobeser to Okimath (from the Alaknanda to the Mandagni valley), 5000–6800 feet, 14–16 September, 1855, n. 8758; Simla *viâ* Kangra and Jamu to Kashmir, 3000–9000 feet, June to September, 1856, n. 13,268.

3. *E. eriostachya*, Benth.; De Cand. l. c. p. 162.—*a.* Western Himalaya, province Garhval, Badrinath, 10,000–10,600 feet, 1–31 August, 1855, n. 10,057. *b.* Tibet, province Balti, Kunes (on the right side of the Shayok), *viâ* Kiris to Neru (on the right side of the Indus), 2–12 August, 1856, n. 5862; Hushe, *viâ* Haldi to Chorkonda, 18–30 July, 1856, n. 5608; Shigar (north-east of Skardo), 31 August, 1856, n. 5394; Khapalu (on the left side of the Shayok), 12 July, 1856, n. 5685; province Hasora, environs of Naugaum (south-east of Astor or Hasora), 15–30 September, 1856, n. 6927; Tashing (north-west of Astor or Hasora), 15–22 September, 1856, n. 7414;

Δ Sangu Sar, 12 September, 1856, n. 6579; Das, *viâ* Naugaum to Hasora or Astor, 8–20 September, 1856, n. 6392.

4. *E. cristata*, Willd.; De Cand. l. c. p. 163.—Western Himalaya, province Garhval, Gaurikund, *viâ* Trijugi Narain and Maser Tal to Bhillung, 24 September to 3 October, 1855, n. 9544; Simla, *viâ* Kangra and Jamu to Kashmir, 3000–9000 feet, June to September, 1856, n. 13,316.

1. *Perilla ocimoides*, L.; De Cand. l. c. p. 163.—Western Himalaya, province Garhval, Joshimath to Gobeser (Alaknanda valley), 10–13 September, 1855, n. 8217; Barkot to Mandrassi (north of the Hill Station, Massuri), 18–22 October, 1855, n. 7999 and 8000; Kharsali, *viâ* Rana, down the Jamna valley to Kutnor, 8900–6100 feet, 14–16 October, 1855, n. 9073; Gobeser to Okimath (from the Alaknanda to the Mandagni valley), 5000–6800 feet, 14–16 September, 1855, n. 8784.

1. *Mentha sylvestris*, L.; δ. *vulgaris*, Benth. in De Cand. l. c. p. 167; foliis supra canescentibus subrugosis, subtus molliter albo-tomentosis. —Western Himalaya, province Garhval, Badrinath, height 10,000–10,600 feet, 1–31 August, 1855, n. 10,028; Simla, *viâ* Kangra and Jamu to Kashmir, 3000–9000 feet; June to September, 1856, n. 13,226.

2. *M. Royleana*, Benth.; De Cand. l. c. p. 169; specimina numerosissima, foliis plus minusve serratis, spicis modo elongatis laxis gracilibus, modo brevioribus densis, basi interruptis, indumento plus minusve tomentoso.—*a*. North-western India, province Panjab, Bandani river, near Peshaur, 15 January, 1857, n. 10191; Jamrud, near Peshaur, 2 January, 1857, n. 10,214. *b*. Western Himalaya, province Marri, Baramula, along both sides of the Chilum valley, down to Mera, height 5500–4000 feet, 4–10 November, 1856, n. 12,399; Simla, *viâ* Kangra and Jamu to Kashmir, 3000–9000 feet, June to September, 1856, n. 13,311; province Kashmir, drained lake basin of Kashmir, environs of Srinaggar, within a circle of 8 miles radius, 2–20 October, 1856, n. 4323, 4495; province Garhval, Toshimath to Gobeser (Alaknanda valley), 10–13 September, 1855, n. 8218; province Kashmir Δ Baltal to Nunner, 15–16 October, 1856, n. 4792; Gurés (north of Srinaggar, the capital of Kashmir), 3–4 October, 1856, n. 7606. *c*. Tibet, province Balti, Hushe, *viâ* Haldi to Chorkonda, 18–20 July, 1856, n. 5606; Shigar (north-east of Skardo), 31 August,

1856, n. 5401; Skardo to Satpar valley (south of Skardo), 2 September, 1856, n. 5520, 5521; Shigar to Skardo, 31 August, 1856, n. 6165; Kunes (on the right side of the Shayok), *viâ* Kiris to Neru (on the right side of the Indus), 2–12 August, 1856, n. 5842; province Hasora, Tashing (north-west of Astor or Hasora), 15–22 September, 1856, n. 7425; environs of Naugaum (south-east of Astor or Hasora, 15–30 September, 1856, n. 6912; Δ Tap to Masenno glacier (Δ Lolio Duru) and Δ Achursbott (Diamer glacier group), 17–19 September, 1856, n. 7251; environs of Tashing (north-west of Astor or Hasora), 16–24 September, 1856, n. 6877; Das, *viâ* Goltere or Naugaum to Hasora or Astor, 8–20 September, 1856, n. 6397, 6398; Gue to Δ Pattere Brok, 13 September, 1856, n. 6201; province Dras, Mulbe to Dras, 8–11 October, 1856, n. 4972.

Var. *β. nervosa*, nob.; foliis lanceolatis grosse serratis, supra subcanescentibus vel glabrescentibus, nervis valde impressis, subtus albotomentosis, nervis viridibus prominentibus, verticillastris approximatis densifloris tomentosis.—Western Himalaya, province Kashmir, Kishtvar Pass to Islamabad, 5–10 August, 1856, n. 5197.

Var. *γ. glabrata*, nob.; foliis supra glabrescentibus, saturate viridibus, subtus canescentibus.—North-western India, province Panjab, Jamrud, near Peshaur, 1300 feet, 2 January, 1857, n. 10,215.

3. *M. arvensis*, L., var. *glabriuscula*, nob. (*M. gentilis*, Smith, non L.), De Cand. l. c. p. 172; caule, foliis pedicellisque glabriusculis, calycibus campanulatis villosis.—Western Himalaya, province Kashmir, drained lake basin of Kashmir, environs of Srinaggar, within a circle of eight miles radius, 10 August to 30 September, 1856, n. 4327.

1. *Lycopus Europæus*, L.; De Cand. l. c. p. 178.—Western Himalaya, province Kashmir, drained lake basin of Kashmir, environs of Srinaggar, 10 August to 30 September, 1856, n. 4384.

1. *Origanum normale*, Don; De Cand. l. c. p. 193.—Western Himalaya, Simla, *viâ* Kangra and Jamu to Kashmir, 3000–9000 feet, June to September, 1856, n. 13,421; province Garhval, Joshimath to Gobeser (Alaknanda valley), 10–13 September, 1855, n. 8175; province Kashmir, drained lake basin of Kashmir, environs of Srinaggar, 2–20 October, 1856, n. 4321, 4559; province Marri, Baramula, along both sides of the Thilum valley down to Mera, 5500–4000 feet, 4–10 November, 1856, n. 12,475; Meri to Marri, 5000–7000 feet, 10–15 November, 1856, n. 11,506.

Var. *β. incanum*, nob.; pilis mollibus patentibus incano-hirsutiusculum.—Western Himalaya, Simla, *viâ* Kangra and Jamu, to Kashmir, 3000–9000 feet, June to September, 1856, n. 13,240.

2. *O. vulgare*, L.; De Cand. l. c. p. 193.—Western Himalaya, province Garhval, Kharsali, *viâ* Rana, down the Jamna valley to Kutnor, 8900–6100 feet, 14–16 October, 1855, n. 9028; Sukki, across the Bamsuru and Chaia Pass to Kharsali (passes between the Bhagiratti and Jamna valleys), 9000–15,400 feet, 9–13 October, 1855, n. 8971; Gaurikund, *viâ* Trijugi Narain, and Maser Tal to Bhillung, 24 September to 3 October, 1855, n. 9438; Badrinath, 10,000–10,600 feet, 1–31 August, 1855, n. 10,061.

Var. *β. subglabrum*, nob.; tota planta, præcipue folia inflorescentiaque glabriuscula, calyces valde glandulosi.—Western Himalaya, province Kashmir, Dorikon Pass to Gures (southern slopes of the Pass, near limit of shrubs), 13,480 feet, 2–3 October, 1856, n. 7560; Gures (north of Srinaggar, the capital of Kashmir), 6000 feet, 3–4 October, 1856, n. 7598.

3. *O. Watsoni*, nob. (Plate LXXXII. fig. 1–4); caulis suffruticosus, decumbens, ramis divaricatis hispidulis; folia breviter petiolata, ovata, obtusiuscula, subtilissime crenulata, glabriuscula, glaucescentia, margine ciliolata, 4–6 lin. longa, 3–4 lin. lata; spiculæ solitariæ ternæve, erectæ, bracteis imbricatis rotundato-ovatis basi cuneatis subcolorato-glaucescentibus palmato-nervosis; calyx tubulosus, glabriusculus, nervosus, dentibus æquilongis acutis, fauce villosus; corollæ tubus vix exsertus.—Species ab *O. vulgari* distincta, differt ramis divaricatis, sæpius decumbentibus, forma bractearum et glaucescentia.—Western Himalaya, province Kashmir, Kishtvar Pass to Islamabad, 6000–8000 feet, 5–10 August, 1856, n. 5124.

1. *Thymus Serpyllum*, L.; De Cand. l. c. p. 200.—Specimina a planta Germanica nullo modo recedunt. Folia modo angustiora, modo latiora, plus minusve ciliata.—*a.* Western Himalaya, province Simla, environs of Simla, height 6000–7300 feet, 1–20 May, 1856, n. 4930; Nagkanda, down to the left side of the Satlej, height 8400–4500 feet, 31 May, 1856, n. 7671; province Kulu, Köt, on the southern slopes of the Chellosi Pass (north of the Satlej), 1 June, 1856, n. 11,291; province Kashmir, drained lake basin of Kashmir, environs of Srinaggar, within a circle of eight miles radius, 2–20 October, 1856, n. 4325, 4483; Choji Pass, down to Δ Baltal (south-western slopes

of the Pass), 14 October, 1856, n. 4825; province Kamaon, Bageser to Munshari, *viâ* Kathi and Namik, height 5000–7800 feet, 24–31 May, 1855, n. 9754; environs of Milum (chief place of the district Johar), 11,200–12,100 feet, 6–25 June, 1855, n. 9669; province Chamba, environs of Nurpur, 4000–5500 feet, 16–20 July, 1856, n. 11,748; province Marri, Baramula, along both sides of the Jhilum valley, down to Mera, 5500–4000 feet, 4–10 November, 1856, n. 12,488; province Garhval, Badrinath, 10,000–10,600 feet, 1–31 August, 1855, n. 10,027. *b.* Tibet, province Ladak, Δ Yuru Kiom, *viâ* Kanji, up the Timti La Pass, 2 July, 1856, n. 5249; province Gnari Khorsum, Δ Laptel to Δ Selchell and Δ Hoti (south of the Satlej), 16–19 July, 1855, n. 7061.

1. *Micromeria biflora*, Benth.; De Cand. l. c. p. 220.—Western Himalaya, province Simla, environs of Simla, 6000–7300 feet, 29 March to 10 April, 1856, n. 4996; Simla, *viâ* Kangra and Jamu to Kashmir, 3000–9000 feet, June to September, 1856, n. 13,213.

1. *Calamintha umbrosa*, Benth.; De Cand. l. c. p. 232.—Western Himalaya, province Kashmir, drained lake basin of Kashmir, environs of Srinaggar, 10 August to 30 September, 1856, n. 4391, 4287; province Marri, Mera to Marri, 5000–7000 feet, 10–15 November, 1856, n. 11,533.—*Forma villosa.* Western Himalaya, province Kashmir, or Kishtvar Pass to Islamabad, 5–10 August, 1856, n. 5125.

2. *C. Clinopodium*, Benth.; De Cand. l. c. p. 233 (*Clinopodium vulgare*, L.).—*a.* Western Himalaya, province Marri, Baramula, along both sides of the Jhilum valley down to Mera, 5500–4000 feet, 4–10 November, 1856, n. 12,497; province Garhval, Badrinath, 10,000–10,600 feet, 1–31 August, 1855, n. 10,069; province Kashmir, water-plants, from the Jhilum at Islamabad, 5800 feet, 17 October, 1856, n. 10,433; drained lake basin of Kashmir, environs of Srinaggar, 2–20 October, 1856, n. 4433, 4492; Gures (north of Srinaggar, the capital of Kashmir), 3–4 October, 1856, n. 7608; Kishtvar Pass to Islamâbad, 5–10 August, 1856, n. 5212. *b.* Tibet, province Hasora, environs of Tashing (north-west of Astor or Hasora), 16–24 September, 1856, n. 6861.

1. *Perowskia abrotanoides*, Karl.; De Cand. l. c. p. 261.—Tibet, province Balti, Kunes (on the right side of the Shayok), *viâ* Kiris to Neru (on the right side of the Indus), 2–12 August, 1856, n. 5841; Saling (on the right side of the Shayok, opposite Khapalu) to Hushe

(on the Chetanga river), 13–15 July, 1856, n. 5832; Poen, on the left side of the Shayok (opposite Chorbat), 10 July, 1856, n. 6146; Hushe, *viâ* Haldi, to Chorkonda, 18–30 July, 1856, n. 5604; Skardo to Satpar valley (south of Skardo), 2 September, 1856, n. 5578; Khapalu (on the left side of the Shayok), 12 July, 1856, n. 5735.

1. *Salvia glutinosa*, L.; De Cand. l. c. p. 276.—*a*. Western Himalaya, province Garhval, Joshimath to Gobeser (Alaknanda valley), 10–13 September, 1855, n. 8216; Simla, *viâ* Kangra and Jamu to Kashmir, 3000–9000 feet, June to September, 1856, n. 13,280; province Kashmir, drained lake basin of Kashmir, environs of Srinaggar, 10 August to 30 September, 1856, n. 4283. *b*. Tibet, province Hasora, Tashing (north-west of Astor or Hasora), 9700 feet, 15–22 September, 1856, n. 6860, 7396.

2. *S. Moorcroftiana*, Wahl.; De Cand. l. c. p. 286.—Western Himalaya, province Simla, environs of Simla, 6000–7300 feet, 12–30 April, 1856, n. 5029, 4706; Nahan, *viâ* Dagshai to Solen (south of Simla), 2800–6500 feet, 17–24 March, 1856, n. 7712; Kalka, *viâ* Kassauli to Sabathu, 2000–4600 feet, 10–23 April, 1856, n. 7769.

3. *S. lanata*, Roxb.; De Cand. l. c. p. 286.—Western Himalaya, province Simla, environs of Simla, 6000–7300 feet, 1–20 May, 1856, n. 4897.

4. *S. Sibthorpii*, Sm., Sibth.; De Cand. l. c. p. 291.—Western Himalaya, or Kishtvar Pass to Islamabad, 5–10 August, 1856, n. 5097.

5. *S. plebeja*, Br.; De Cand. l. c. p. 355.—Western Himalaya, province Kashmir, drained lake basin of Kashmir, environs of Srinaggar, 10 August to 30 September, 1856, n. 4386.

6. *S. Ægyptiaca*, L.; De Cand. l. c. p. 355.—North-western India, province Panjab, Raulpindi to Pind Dadan Khan (on the southern foot of the Salt Range), 1300–2100 feet, 19–22 December, 1856, n. 11,644; province Panjab, Musakel (south of Kalabagh, on the Indus), along the salt range, *viâ* Varcha and Choia to Gujrat, 1400–2500 feet, 17 February to 5 March, 1857, n. 11,165.

1. *Nepeta graveolens*, Benth.—Tibet, province Tsanskar, Δ Pader (on the northern foot of the Shinko La Pass) to Sulle, 20–21 June, 1856, n. 6241; province Tsanskar, Sulle to Padum, 22–24 June, 1856, n. 6697; province Balti, Khapalu (on the left side of the Shayok), 12 July, 1856, n. 5751.

2. *N. connata*, Royle; De Cand. l. c. p. 371.—*a*. Western Himalaya, province Kashmir, Gures (north of Srinaggar, the capital of Kashmir), 3–4 October, 1856, n. 7607; Gures, across the Ulli Plain and two small passes to Bandipur (north-west of Srinaggar), 5–12 October, 1856, n. 12,042; water-plants, from the Jhilum at Islamabad, height 5800 feet, 17 October, 1856, n. 10,441; Dorikon Pass to Gures (southern slopes of the Pass), 2–3 October, 1856, n. 7582. *b*. Tibet, province Hasora, northern foot of the Dorikon Pass (slopes towards Tashing), 1 October, 1856, n. 6830, 6831; Das, *viâ* Naugaum to Hasora or Astor, 8–20 September, 1856, n. 6382.

3. *N. eriostachys*, Benth.; De Cand. l. c. p. 371.—Tibet, province Balti, Hushe, *viâ* Haldi to Chorkonda, 18–30 July, 1856, n. 5603; Skardo to Satpar valley (south of Skardo), 2 September, 1856, n. 5542.

4. *N. nervosa*, Royle; De Cand. l. c. p. 372.—Western Himalaya, province Kashmir, Gures across the Ulli Plain, and two small passes to Bandipeer (north-west of Srinaggar), 5–12 October, 1856, n. 12,040.

5. *N. campestris*, Benth.; De Cand. l. c. p. 372.—Western Himalaya, province Kashmir; water plants from the Jhilum at Islamabad, 5800 feet, 17 October, 1856, n. 10,443, 10,453.

6. *N. spicata*, Benth.; De Cand. l. c. p. 372.—Western Himalaya, province Marri, Baramula, along both sides of the Jhilum valley, down to Mera, 5500–4000 feet, 4–10 November, 1856, n. 12,368; province Garhval, Badrinath, 10,000–10,600 feet, 1–31 August, 1855, n. 10,060.

7. *N. elliptica*, Royle; De Cand. l. c. p. 373.—Western Himalaya, province Kashmir, or Kishtvar Pass to Islamabad, 5–10 August, 1856, n. 5098.

8. *N. ciliaris*, Benth.; De Cand. l. c. p. 379.—Western Himalaya, province Kashmir; water plants from the Jhilum at Islamabad, 5800 feet, 17 October, 1856, n. 10,442, 10,452.

9. *N. floccosa*, Benth.; De Cand. l. c. p. 380.—Tibet, province Ladak, Kharbu Koma to Shaksi (south-west of Dah), 3 July, 1856, n. 5345; Rumbak to Kanda La Pass (south-west of Leh), 1–7 September, 1856, n. 6285; province Balti, Saling (on the right side of the Shayok, opposite Khapalu to Flushe (on the Chetanga river) 13–15 July, 1856, n. 5480; Δ Thalela to Bagmaharal (north-east of Skardo and

Shigar, August, 1856, n. 5917; Kunes (on the right side of the Skayok) *viâ* Kiris to Neru (on the right side of the Indus), 2–12 August, 1856, n. 5812; Skardo to Satpar valley (south of Skardo), 2 September, 1856, n. 5536; province Dras, Mulbe to Dras, 8–11 October, 1856, n. 4977; province Tsanskar △ Pader on the northern foot of the Shinko La Pass to Sulle, 20–21 June, 1856, n. 6244; province Hasora, Das *viâ* Goltere or Naugaum to Hasora or Astor, 8–10 September, 1856, n. 6425.

10. *N. ruderalis*, Hamilt.; De Cand. l. c. p. 381.—Tibet, province Hasora, Das *viâ* Naugaum to Hasora, 8–20 September, 1856, n. 6381, 6406.

11. *N. Cataria*, L.; De Cand. l. c. p. 383.—Western Himalaya, province Kashmir, drained lake basin of Kashmir, environs of Srinaggar, within a circle of 8 miles radius, 10 August to 30 September, 1856, n. 4389; province Chamba, environs of Nurpur, 4000–5500 feet, 16–20 July, 1856, n. 11,741.

12. *N. salviæfolia*, Royle; De Cand. l. c. p. 388.—Tota planta plus minusve albo-tomentosa, corollis longioribus brevioribusve. *a.* Western Himalaya, province Kashmir, environs of Srinaggar, 2–10 October, 1856, et 10 August to 30 September, 1856, n. 4435, 4524. Hujus speciei varietas peculiaris occurrit *β. floccosa!* foliis utrinque albo-tomentosis, calycibus plus minusve floccoso-tomentosis. *b.* Tibet, province Hasora, Gue to △ Pattere Brok, 13 September, 1856, n. 6208; Tashing (north-west of Astor or Hasora), 15–22 September, 1856, n. 6872, 7399; environs of Naugaum (south-west of Hasora) 15–30 September, 1856, n. 6916; province Dras, Kargil *viâ* Suru to Tsringmat 10–11 October, 1856, n. 7209.

13. *N. Sabinei*, nob.! (Plate LXXXII. fig. 5–7).—Herba procumbens, ramis adscendentibus pubescentibus vel subvillosis. Folia approximata, petiolata, ovato-oblonga, acutiuscula, serrata, basi cuneata, in petiolum canaliculatum 2–4 lin. long. angustata, supra incana, glabrescentia, subtus plus minusve albo-tomentosiuscula, nervis subtus valde prominentibus 4–6 lin. long., 3–4 lin. lata. Spica longe pedunculata, oblongo-cylindrica, basi interrupta, bracteis lanceolatis acuminatis integerrimis ciliatis venosis subcoloratis, calyce sublongioribus. Calyx tubulosus, subincurvus, pubescens, dentibus subulato-acuminatis villosissimis tubo sublongioribus. Corolla incurva, calyce duplo longior. Nuculæ læves, nitidæ.—At finis *N. ellipticæ*, Royle, differt notis indicatis, præ-

cipue foliorum forma et indumento !.—Tibet, province Balti Δ Thale La to Bagmaharal (north-east of Skardo and Shigar), top of Thale La Pass, 15,832 feet, 30 August, 1856, n. 5936 ; province Hasora, Gue to Δ Pattere Brok, top of Gue Pass, 12,592 feet, 13 September, 1856, n. 6209.

1. *Dracocephalum staminum*, Karel et Kiril ; De Cand. l. c. p. 398. —Tibet, province Balti Δ Thale La to Bagmaharal (north-east of Skardo and Shigar), 30 August, 1856, n. 5933, 5916 ; province Ladak, Rumbak to Kanda La Pass (south-east of Leh), 1–7 September, 1856, n. 6287.

2. *D. speciosum*, Benth. ; De Cand. l. c. p. 399.—Western Himalaya, province Garhval, Sukhi across the Bamsuru and Choia Pass to Kharsali (Passes between the Bhagirath and Jamna valleys), 9000–15,400 feet, 9–13 October, 1855, n. 8979.

3. *D. Moldavica*, L. ; De Cand. l. c. p. 401.—Tibet, province Balti, Shigar (north-east of Skardo), 31 August, 1856, n. 6184, 5406 ; Kunes (on the right side of the Shayok) *viâ* Kiris to Neru (on the right side of the Indus), 2–12 August, 1856, n. 5833.

4. *D. heterophyllum*, Benth. ; De Cand. l. c. p. 401.—Tibet, province Gnari Khorsum, left side of the Satlej, comprising Δ Tarang Δ Ninkchang Δ Dulla, 14,800-15,500 feet, 17–26 July, 1856, n. 6623.

1. *Prunella vulgaris*, L. ; De Cand. l. c. p. 410.—*a.* Western Himalaya, province Kashmir, Gures (north of Srinaggar, the capital of Kashmir), 3–4 October, 1856, n. 7618 ; drained lake basin of Kashmir, environs of Srinaggar, 2–20 October, 1856, n. 4387–4490 ; Kishtvar Pass to Islamabad, 5–10 August, 1856, n. 5102 ; province Marri, Kera to Marri, 5000–7000 feet, 10–15 November, 1856, n. 11,564 ; province Garhval, Badrinath, 10,000–10,600 feet, 1–31 August, 1855, n. 10,049 ; province Rajauri, Uri, across the Punch Pass, *viâ* Kahuta to Punch, 5000-9000 feet, 6–9 November, 1856, n. 12,185. *b.* Tibet, province Balti, Shigar (north-east of Skardo), 31 August, 1856, n. 5398 ; Kunes (on the right side of the Shayok), *viâ* Kiris to Neru (on the right side of the Indus), 2–12 August, 1856, n. 5826.

1. *Scutellaria orientalis*, L. ; De Cand. l. c. p. 413.—Western Himalaya, province Kamaon Δ Roghas, up the Milum glacier to Δ Bitterguar, 18–19 June, 1855, n. 9849.

2. *S. repens*, Hamilt.; De Cand. l. c. p. 429.—Western Himalaya, province Simla, Nahan *viâ* Dagshai to Solen (south of Simla), 2800-6500 feet, 17–24 March, 1856, n. 7707.

3. *S. angulosa*, Benth.; De Cand. l. c. p. 430.—Western Himalaya, province Simla, environs of Simla, 6000-7300 feet, 12–30 April, 1856, n. 4717.

1. *Marrubium propinquum*, F. et M., *β. intermedium*, Benth. in De Cand. l. c. p. 450; calycis dentibus 5 subrecurvis!—Western Himalaya, province Kashmir, drained lake basin, 10 August to 30 September, 1856, n. 4320.

1. *Craniotome versicolor*, Rchb.; De Cand. l. c. p. 455.—Western Himalayá, Simla *viâ* Kangra and Jamu to Kashmir, 3000–9000 feet, June to September, 1856, n. 13,146; province Garhval, Gobeser to Okimath (from the Alaknanda to the Mandagni valley), 5000–6800 feet, September, 1855, n. 8787.

1. *Anisomeles ovata*, Br.; De Cand. l. c. p. 455.—Eastern India, province Assam, Mangeldai to the foot of the Bhutan Himalaya, 100-300 feet, 1 December, 1855, n. 13,463.

1. *Stachys sericea*, Wall.; De Cand. l. c. p. 465.—Western Himalaya, province Kashmir, Kishtvar Pass to Islamabad, 5–10 August, 1856, n. 5099.

2. *S. vestita*, Benth.; De Cand. l. c. p. 466.—Western Himalaya, province Kashmir, drained lake basin of Kashmir, environs of Srinaggar, 10 August to 30 September, 1856, n. 4329.

3. *S. melissæfolia*, Benth.; De Cand. l. c. p. 466.—Western Himalaya, province Garhval, Gaurikund *viâ* Trijugi Narain and Maser Tal to Bilung, 24 September to 3 October, 1855, n. 9439.

4. *S. splendens*, Wall.; De Cand. l. c. p. 466.—Western Himalaya, province Kashmir, Kishtvar Pass to Islamabad, 5–10 August, 1856, n. 5159; province Garhval, Badrinath, 10,000-10,600 feet, 1–31 August, 1855, n. 10,076.

1. *Leonurus Royleanus*, Benth.; De Cand. l. c. p. 499.—Western Himalaya, province Garhval, Gaurikund *viâ* Trijugi Narain and Maser Tal to Bhillung, 24 September to 3 October, 1855, n. 9440; province Kashmir Δ Baltal to Nunner, 15–16 October 1856, n. 4801.

2. *L. Sibiricus*, L.; De Cand. l. c. p. 501.—Sikkim Tarai and Bengal, water plants from the Tista (from the foot of the Sikkim

Himalaya to the Brahmaputra valley), 350-120 feet height, August to September, 1855, n. 12,721.

1. *Lamium rhomboideum*, Benth.; De Cand. l. c. p. 504.—Tibet, province Gnari Khorsum, northern foot of the Uta Dhura Pass across the Kiunga Pass to its northern foot, 16,200-17,600 feet, 9–12 July, 1855, n. 7341; Poti *viâ* Lamorti to Toling, 5-15 September, 1855, n. 7094; province Ladak, Rumbak to Kama La Pass, September, 1856, n. 6305.

2. *L. amplexicaule*, L.; De Cand. l. c. p. 508.—Central Himalaya, province Nepal, environs of Kathmandu, 5000–7000 feet, 4–8 March, 1857, n. 13,029.

3. *L. petiolulatum*, Royle; De Cand. l. c. p. 509.—Western Himalaya, province Simla, environs of Simla, 6000–7300 feet, May, 1856, n. 4900.

4. *L. album*, L.; De Cand. l. c. p. 510.—Western Himalaya, Simla *viâ* Kangra and Jamu to Kashmir, 3000–9000 feet, June to September, 1856, n. 13,282.

1. *Leucas hyssopifolia*, Benth.; De Cand. l. c. p. 531.—Western Himalaya, province Kamaon, Bageser to Munshari *viâ* Kathi and Namik, 5000–7800 feet, 24–31 May, 1855, n. 9812.

2. *L. aspera*, Spr.; De Cand. l. c. p. 532.—Central India, province Malva, environs of Amarkantak (Paidera and source of the Jhilla), 2000-2900 feet, 26–29 January, 1856, n. 11,905; Gangetic Delta, province Bahar, in the dry bed of the river Gandak near Patna, 10-31 January, 1857, n. 12,863.

3. *L. cephalotes*, Spr.; De Cand. l. c. p. 532.—Western Himalaya, Simla *viâ* Kangra and Jamu to Kashmir, 3000–9000 feet, June to September, 1856, n. 13,228.

1. *Leonotis nepetæfolia*, R. Br.; De Cand. l. c. p. 535.—Bengal, province Bahar, in the dry bed of the river Gandak near Patna, 150–180 feet, 10–31 January, 1857, n. 12,897.

1. *Phlomis Cashmeriana*, Royle; De Cand. l. c. p. 542.—Western Himalaya, province Marri, Baramula, along both sides of the Jhilum valley, down to Mera, 5500–4000 feet, 4–10 November, 1856, n. 12,508.

2. *P. cordata*, Royle; De Cand. l. c. p. 545.—Western Himalaya, province Garhval, Badrinath, 10,000–10,600 feet, 1–31 August, 1855, n. 10,100.

1. *Gomphostemma parviflorum*, Benth.; De Cand. l. c. p. 551.—Eastern India, province Khassia, environs of Cherapundji till near Mairong, 2800–4500 feet, October, 1855, n. 214.

1. *Teucrium macrostachyum*, Wall.; De Cand. l. c. p. 574.—Central Himalaya, province Nepal, environs of Kathmandu, 5000–7000 feet, 4–8 March, 1857, n. 13,028.

2. *T. quadrifarium*, Hamilt.; De Cand. l. c. p. 583.—Western Himalaya, province Garhval, Barkot to Mandrassi (north of the Hill Station, Massuri), 4000–8000 feet, 18–22 October, 1855, n. 7989; Gaurikund *viâ* Trijugi Narain and Maser Tal to Bhillung, 7200–9500 feet, 24 September to 3 October, 1855, n. 9478, 9573; Kharsali *viâ* Rana, down the Jamna valley to Kutnor, 8900–6100 feet, 14–16 October, 1855, n. 9057.

3. *T. Scordium*, L.; De Cand. l. c. p. 586.—Western Himalaya, province Kashmir, drained lake basin, 10 August to 30 September, 1856, n. 4385.

1. *Holmskioldia sanguinea*, Retz; Benth. Lab. p. 642.—*a.* Eastern India, province Khassia, environs of Cherapunji till near Mairong, 2800–4500 feet, 1–30 October, 1855, n. 351, 578; province Assam, Mangeldai, to the foot of the Bhutan Himalaya, 100–300 feet, 1 December, 1855, n. 13,483. *b.* Western Himalaya, province Rajauri, Punch *viâ* Kotli to Islamabad, 4000–2000 feet, 10–15 November, 1856, n. 12,584.

SCROPHULARINEÆ.

1. *Verbascum Thapsus*, L.; De Cand. Prod. x. p. 225.—*a.* Western Himalaya, province Rajauri, Uri, across the Punch Pass *viâ* Kahuta to Punch, 5000–9000 feet high, 6–9 November, 1856, n. 12,141; Punch *viâ* Kotli to Islamabad, 4000–2000 feet, 10–15 November, 1856, n. 12,592; province Kashmir, Gures, across the Ulli Plain, and two small Passes to Bandipur (north-west of Srinaggar), 5–12 October, 1856, n. 12,072; water plants from the Jhilum at Islamabad, 5800 feet, 17 October, 1856, n. 10,462; Kishtvar Pass to Islamabad, 5–10 August, 1856, n, 5201; Choji Pass down to Δ Baltal (south-western slopes of the Pass), 14 October, 1856, n. 4830; province Lahol, Kolung (opposite Kardong) up to the limit of trees (slopes to the right side of the Bhaga river), 13 June, 1856, n. 3524; Darche on the Bhaga river, above Kardong, 16 June, 1856, n. 3945, 2814; province

Garhval, Nelong, *viâ* Mukba, across the Damdar or Hatka Chaura Pass to Ussilla, in the Tons valley, 26 September to 6 October, 1855, n. 9722; province Simla, environs of Simla, 6000–7300 feet, 12–30 April, 1856, n. 4678; province Kishtvar, Bhadrar to Kishtvar, 23–26 July, 1856, n. 3477. *b.* Tibet, province Hasora, environs of Tashing (north-west of Astor or Hasora), 16–24 September, 1866, n. 7438, 6851.

β. cuspidatum! V. Indicum, Wall. in Roxb. Fl. Ind. ii. p. 256; bracteis longe cuspidatis, foliis longe acuminatis!—Western Himalaya, province Jamu, Padri Pass to Bhadrar, 17–22 July, 1856, n. 3104, 3103; province Kashmir, drained lake basin, 10 August to 30 September, 1856, n. 4309; province Gahrval, Joshimath to Gobeser (Alaknanda valley), 10–13 September, 1855, n. 8194; province Chamba, Kali Pass to Chamba, 28 June to 8 July, 1856, n. 3348; province Kishtvar, Tiloknath up to the Kali Pass (south-west of Tiloknath), 24–27 June, 1856, n. 3922.—Variat interdum lana densissima, lutea. Tibet, province Dras, Kargil *viâ* Suru to Tsringinat, 10–11 October, 1856, n. 7214.

3. *V. Blattaria*, L.; De Cand. l. c. p. 230.—*a.* Western Himalaya, Simla *viâ* Kangra and Jamu to Kashmir 3000–9000 feet, June to September, 1856, n. 13,398. *b.* Eastern Himalaya, province Sikkim, Singhalila ridge from Tonglo to Falut, 1200–9000 feet, May to June, 1855, n. 14,744.

1. *Antirrhinum Orontium*, L.; De Cand. l. c. p. 290.—Specimen flaccidum, pilosum!—North-western India, province Panjab, Peshaur, 18 December, 1856, to 9 January, 1857, n. 2625.

1. *Scrophularia polyantha*, Royle; De Cand. l. c. p. 304.—Western Himalaya, province Kishtvar, near the town of Kishtvar, 27–30 July, 1856, n. 2979; province Jamu, Padri Pass to Bhadrar, 17–22 July, 1856, n. 3079; province Kashmir, drained lake basin, 10 August to 30 September, 1856, n. 4383.

9. *S. Griffithsii*, Benth.; De Cand. l. c. p. 312.—Western Himalaya, province Kamaon, Δ Roghas up the Milum glacier to Δ Biterguar, 14,000–14,600 feet, 690 feet below upper limit of shrub vegetation at this place, 18 to 19 June, 1855, n. 9836.

1. *Alectra Indica*, Benth.; De Cand. l. c. p. 339.—Eastern India, province Khassia, environs of Cherapunji till near Mairong, 2800–4500 feet high, 1–30 October, 1855, n. 409.

1. *Doratanthera linearis*, Benth.; De Cand. l. c. p. 347.—North-western India, province Panjab, Dera Ismael Khan, on the right side of the Indus, 23–26 February, 1857, n. 10,806; from Kalabagh along the western side of the Indus to Dera Ismael Khan, 400–800 feet, 15–22 February, 1857, n. 10,328.

1. *Lindenbergia polyantha*, Royle; De Cand. l. c. p. 377?—*a.* Eastern India, province Khassia, environs of Cherapunji till near Mairong, 2800–4500 feet, 1–30 October, 1855, n. 416. *b.* North-western India, province Panjab, Musakel (south of Kalabagh on the Indus), along the Salt range *viâ* Varcha and Choia to Gujrat, 1400–2500 feet, 17 February to 5 March, 1857, n. 11,084.

1. *Stemodia viscosa*, Roxb.; De Cand. l. c. p. 381.—Eastern India, province Assam, Mangeldai to the foot of the Bhutan Himalaya, 100–300 feet, 1 December, 1855, n. 13,520.

1. *Limnophila gratioloides*, R. Br.; *β. myriophylloides*, Benth.; De Cand. l. c. p. 389; foliis fere omnibus capillaceo-multifidis.—Western Himalaya, province Kashmir, drained lake basin of Kashmir, environs of Srinaggar, 2–20 October, 1856, n. 4608.

2. *L. sessiliflora*, Blume; De Cand. l. c. p. 389.—Eastern India, province Assam, Mangeldai to the foot of the Bhutan Himalaya, 100–300 feet, 1 December, 1855, n. 13,485.

1. *Herpestes Monnieria*, H. B. et K. T. H.; De Cand. l. c. p. 400.—Western Himalaya, Simla *viâ* Kangra and Jamu to Kashmir, 3000–9000 feet, June to September, 1856, n. 13,346.

1. *Torenia edentula*, Griff.; De Cand. l. c. p. 410.—Eastern Himalaya, province Sikkim, environs of Darjiling, 6000–8000 feet, June to July, 1855, n. 12,589, 12,354.

2. *T. Asiatica*, L.; De Cand. l. c. p. 410.—Eastern India, province Khassia, environs of Cherapunji till near Mairong, 2800–4500 feet, 1–30 October, 1855, n. 467.

3. *T. parviflora*, Hamilt.; De Cand. l. c. p. 410?—Eastern India, province Khassia, environs of Cherapundji till near Mairong, 2800–4500 feet, 1–30 October, 1855, n. 331.

1. *Vandellia crustacea*, Benth.; De Cand. l. c. p. 413.—Bengal, in the dry bed of the river Gandak, near Patna, 150–180 feet, 10–31 January, 1857.

1. *Bonnaya brachiata*, Link et Otto; De Cand. Prodr. p. 420.—Eastern India, province Khassia, environs of Cherapunji till near Mairong, 2800–4500 feet, 1–30 October, 1855, n. 244.

1. *Buddleia crispa*, Benth.; De Cand. l. c. p. 444.—*β. decipiens*, nob.; tomento denso subferrugineo vel ochraceo, ramis subtetragonis compressiusculis, foliis breviter petiolatis ovato-oblongis acutis, inæqualiter interdum sinuato-dentatis, basi rotundato-truncatis, supra rugosis, demum glabrescentibus, subtus velutino-tomentosis, 3–4 poll. long., 1½–2 poll. lat.; capitulis multifloris densis approximatis breviter pedunculatis, in ramos breves foliatos dispositis, corollæ tubo calycem subcampanulatum duplo superante.—An fortasse species nova? Specimen unicum floriferum incompletum in promptu habeo.—Western Himalaya, province Simla, environs of Simla, 6000–7300 feet, 29 March to 10 April, 1856, n. 5028.

2. *B. Asiatica*, Lour.; De Cand. l. c. p. 446.—Eastern India, province Assam, Mangeldai to the foot of the Bhutan Himalaya, 100–300 feet, 1 December, 1855, n. 13,537.

3. *B. Neemda*, Hamilt.; De Cand. l. c. p. 446.—Central India, province Bandelkhand Rima (Riva) to Solagi (forty miles south of Allahabad), 12–15 February, 1856, n. 12,700.

4. *B. Martii*, nob.!—Rami tetragono-subulati, glaberrimi. Folia oblongo-lanceolata, breviter acuminata, inæqualiter serrata, basi integerrima in petiolum brevissimum angustata, et cum folio opposito membrana angustissima connata, membranacea, supra glabra, saturate viridia, subtus tenuissime pubescentia, ochracea, 4–6 poll. longa, 2 poll. lata. Thyrsi spicæformes elongati, conferti, basi interrupti, glomerulis paucifloris breviter pedicellatis. Calyces campanulati tomentosi ochracei dentibus brevibus acutis. Corollæ tubus calycem subtriplo superans, dense tomentosus. Capsulæ oblongo-ellipticæ, tomentosæ, calyces duplo superantes.—Proxima quidem *B. macrostachyæ*, Benth., attamen notis indicatis bene distinguenda.—This species is not figured now since at no distant time better specimens than those at hand are expected.—Eastern India, province Khassia, environs of Cherapundji till near Mairong, 2800–4500 feet, 1–30 October, 1855, n. 562.

1. *Digitalis grandiflora*, All.; De Cand. l. c. p. 450.—Eastern Himalaya, province Sikkim, environs of Darjiling, 6000–8000 feet, June to July, 1855, n. 12,603.

1. *Picrorhiza Kurrooa*, Royle; De Cand. l. c. p. 454.—Western Himalaya, province Kamaon, environs of Milum, 11,200–12,100 feet, 6–25 June, 1855, n. 9647.

1. *Wulfenia Amherstianæ*, Benth.; De Cand. l. c. p. 455 affinis!—Western Himalaya, province Chamba, Chamba to Padri Pass (north-west of Chamba), 9–16 July, 1856, n. 3622; province Kamaon, Bageser to Munshari *viâ* Kathi and Namik, 5000–7800 feet, May, 1855, n. 9771.

1. *Veronica Anagallis*, L.; De Cand. l. c. p. 466.—*a.* North-western India, province Panjab, from Kalabagh along the western side of the Indus *viâ* Lakki to Dera Ismael Khan, 15–22 February, 1857, n. 10,309; Badani river near Peshaur, 15 January, 1857, n. 10,103; province Panjab, Peshaur, 18 December, 1856, to 9 January, 1857, n. 2628, 2650, 2607, 2696. *b.* Bengal, in the dry bed of the river Gandak near Patna, 150–180 feet, 10–31 January, 1857, n. 12,880. *c.* Western Himalaya, province Jamu Padri Pass to Bhadrar, 17–22 July, 1856, n. 3062. *d.* Tibet, province Balti, Kunes (on the right side of the Shayok) *viâ* Kiris to Neru (on the right side of the Indus), 2–12 August, 1856, n. 5843; province Ladak, Leh to Nurla (right side of the Indus valley), 10,723–9773 feet, 15 September to 5 October, 1856, n. 1600; Leh to Dah, 10,723–9640 feet, water plants from the Indus, 9–21 July, 1856, n. 1448.

Var. *β. pubescens*, Benth.; De Cand. l. c. p. 468; caule undique pubescente vel villoso.—*a.* Western Himalaya, province Kashmir, drained lake basin of Kashmir, environs of Srinaggar, 5200 feet, 2–20 October, 1856, n. 4572; province Kishtvar, near the town of Kishtvar, 27–31 July, 1856. *b.* Tibet, province Ladak, Leh to Dah, water plants from the Indus, 9–21 July, 1856, n. 1457, and 15 July to 5 August, 1856, n. 1021.

2. *V. punctata*, Hamilt.; De Cand. l. c. p. 468.—*a.* North-western India, province Panjab, environs of Raulpindi, 1000–2600 feet, 15–28 November, 1856, n. 10,924. *b.* Eastern Himalaya, province Sikkim, environs of Darjiling, 6000–8000 feet, June to July, 1855, n. 12,403; Singhalila ridge from Tonglo to Falut, May to June, 1855, n. 14,747 *c.* Tibet, province Dras, surrounding the hot springs near Mulbe, 8 October, 1856, n. 4746.

3. *V. Beccabunga*, L.; De Cand. l. c. p. 468.—Western Himalaya, province Lahol, Kardong to Darche in the Bhaga valley, 15–18 June, 1856, n. 2840; province Kashmir, drained lake basin of Kashmir, environs of Srinaggar, 2–20 October, 1856, n. 4593; province Chamba, Kali Pass to Chamba, 28 June to 8 July, 1856, n. 3222.

4. *V. lanosa*, Benth.; De Cand. l. c. p. 481.—Western Himalaya, province Lahol, Kardong to Darche in the Bhaga valley, 15–18 June, 1856, n. 2824.

5. *V. capitata*, Royle; De Cand. l. c. p. 481.—Tibet, province Gnari Khorsum, northern foot of the Uta Dhura Pass, across the Kiungar Pass to its northern foot, 16,200–17,600 feet, 9–12 July, 1855, n. 7331.

Var. *β. tomentosa!* pilis densissimis albis cano-tomentosa, foliis ovato-oblongis crenulatis vel inæqualiter denticulatis.—Tibet, province Ladak, Timti La Pass *vid* Δ Timti Do to Karbu Koma, 15,550–12,000 feet, July, 1856, n. 6546.

6. *V. serpyllifolia*, L.; De Cand. l. c. p. 482.—North-western India, province Panjab, Peshaur, 1280 feet, 18 December, 1856, to 9 January, 1857, n. 2607.

7. *V. biloba*, L.; De Cand. l. c. p. 485.—*a.* Western Himalaya, province Kamaon, environs of Milum (chief place of the district Johar), 11,200–12,100 feet, June, 1855, n. 9652; province Lahol, right shore of the Bhaga (lake Chinab) at Kolung (opposite Kardong), June, 1856, n. 3392; Kardong to Darche in the Bhaga valley, 15–18 June, 1856, n. 2838. *b.* Tibet, province Gnari Khorsum, left side of the Satlej, comprising Δ Tarang Δ Ninkehang Δ Dulla, 14,800–15,500 feet, 17–26 July, 1856, n. 6639.

8. *V. Buxbaumii*, Tenore; De Cand. l. c.—North-western India, province Panjab, Peshaur, 1280 feet, 18 December, 1856 to 9, January, 1857, n. 2647, 2648, 2700; province Panjab, Lahor, 839 feet, 10–14 March, 1857, n. 10,508; Musakel (south of Kalabagh on the Indus) along the salt range, *vid* Varcha and Choia to Gujrat, 1400–2500 feet, 17 February to 5 March, 1857, n. 11,090; from Kalabagh along the western side of the Indus, *vid* Lakki to Dera Ismael Khan, 15–22 February, 1857, n. 10,391; Badami river near Peshaur, 850 feet, 15 January, 1857, n. 10,181.

1. *Striga hirsuta*, Benth.; De Cand. l. c. p. 502.—Sikkim, Tarai, and Bengal, water plants from the Tista (from the foot of the Sikkim Himalaya to the Brahmaputra valley), 550–120 feet, August to September, 1855, n. 12,726, 12,700.

1. *Sopubia stricta*, G. Don; De Cand. l. c. p. 522.—Tibet, province Balti, Shigar (north-east of Skardo), 7537 feet, 31 August, 1856, n. 5412; environs of Skardo, 6900–7500 feet, August to September, n. 795.

1. *Odontites rubra*, Pers.; De Cand. l. c. p. 551.—Specimina incana, interdum subtomentosa.—Tibet, province Balti, environs of Skardo, 6900–7500 feet, 6 August to 4 September, 1856, n. 757; Shigar to Skardo, 31 August, 1856, n. 5409, 6160; Kunés (on the right side of the Shayok), *viâ* Kiris to Neru (on the right side of the Indus), 2–12 August, 1856, n. 5848.

1. *Euphrasia officinalis*, L. Hujus speciei maxime variabilis, duæ formæ memorabiles occurrunt:

α. vulgaris, Benth.; De Cand. l. c. p. 552.—Specimina a planta Germanica nullo modo recedunt!—*a.* Western Himalaya, province Lahol, right shore of the Bhaga (later Chinab) at Kolung (opposite Kardong), 14 June, 1856, n. 3394; Kardong to Darche, in the Bhaga valley, 15–18 June, 1856, n. 2826; province Chamba, Chamba to Padri Pass (north-west of Chamba), 9–16 July, 1856, n. 3635; province Chamu, Padri Pass to Bhadrar, 17–22 July, 1856, n. 3138; province Kishtvar, Kishtvar to the Kishtvar Pass, 1–4 August, 1856, n. 3761; province Kishtvar, near the town of Kishtvar, 27–30 July, 1856, n. 2957. *b.* Tibet, province Hasora, Tashing (northwest of Hasora), 15–22 September, 1856, n. 7404; province Balti Δ Thale La to Bagmaharal (north-east of Skardo and Shigar), 30 August, 1856, n. 5939; environs of Skardo, 6900–7500 feet, 6 August to 4 September, 1856, n. 788; province Nubra, Charasa to Aranu (right side of the Nubra valley), 3–4 August, 1856, n. 2134.

β. Tatarica, Benth.; De Cand. l. c. p. 552; elongata, pubescens, foliis late ovatis fere orbiculatis, floralibus inciso-dentatis, corollis majoribus minoribusve.—*a.* Western Himalaya, province Kishtvar, Tiloknath up to the Kali Pass (south-west of Tiloknath), 24–27 June, 1856, n. 3919. *b.* Tibet, province Nubra Panamik (left side of the Nubra valley), 14,146 feet, 24–31 July, 1856, n. 2029.

1. *Pedicularis pectinata*, Wall.; De Cand. l. c. p. 560.—Western Himalaya, province Kashmir, drained lake, 10 August to 30 September, 1856, n. 4408; province Chamba, Chamba to Padri Pass (north-west of Chamba), 9–16 July, 1856, n. 3678; province Kishtvar to the Kishtvar Pass, 1–4 August, 1856, n. 3718–3719.

2. *P. pyramidata*, Royle; De Cand. l. c. p. 560.—*a.* Western Himalaya, province Kashmir, Kishtvar Pass to Islamabad, 5–10 August, 1856, n. 5184; province Lahol, Kardong to Darche, in the Bhaga valley, 15–18 June, 1856, n. 2865; province Chamba, Kali Pass to

Chamba, 28 June to 8 July, 1856, n. 3213. *b.* Tibet, province Ladak, Timti La Pass *viâ* Δ Timti Do to Kharbu Koma, 2–3 July, 1856, n. 6548.

3. *P. tenuirostris*, Benth.; De Cand. l. c. p. 561.—Speciei antecedenti proxima, et forsan nil nisi ejus varietas!—Tibet, province Balti Δ Thale La to Bagmaharal (north-east of Skardo and Shigar), 30 August, 1856, n. 5965.

4. *P. gracilis*, Wall.; De Cand. l. c. p. 561.—Western Himalaya, province Garhval, Gobeser to Okimath (from the Alaknanda to the Mandagni valley), 5000–6800 feet, 14–16 September, 1855, n. 10,063, 8813.

5. *P. verticillata*, L.; De Cand. l. c. p. 563.—Specimina numerosissima, magnitudine partium omnium variantia, caulibus longioribus brevioribusve, foliorum segmentis sæpius cartilagineo-dentatis, calycibus modo glabriusculis, modo hirsutis.—Tibet, province Ladak, Yugu to Leh (right side of the Indus valley), 1–31 August, 1856, n. 931, 1139, 1981; environs of Gia, 30–31 July, 1856, n. 1677; Upshi to Gulab-Garh (left side of the Indus valley), 28 June, 1856, n. 1573; Leh to Dah, water plants from the Indus, 9–21 July, 1856, n. 1461; Durguk to Changla Pass, 5–6 July, 1856, n. 1632; Leh, 1–15 July, 1856, n. 1377; Kaltse to Damkar, 15–19 July, 1856, n. 1106; Kandala Pass *viâ* Shingo to Marka, 26 August to 8 September, 1856, n. 1725; Δ Yuru Kiám *viâ* Kanoji, up the Timti La Pass, 2 July, 1856, n. 5241, 5242; Timti La Pass *viâ* Δ Timti Do to Kharbu Koma, 2–3 July, 1856, n. 6525; province Nubra, Panamik to Δ Changlung (left side of the Nubra valley), 9 August, 1856, n. 2245, 2042; Tsarasa to Aranu, 3–4 August, 1856, n. 2113; province Balti, Hushe *viâ* Haldi to Chorkonda, 18–30 July, 1856, n. 5605, Δ Choka, on the left side of the Mustak glacier, above Δ Shingtsakbi, 19 August, 1856, n. 6339.

6. *P. Hookeriana*, Wall.; De Cand. l. c. p. 564.—Tibet, province Spiti, northern foot of Tari Pass, *viâ* Mud to southern foot of Parang Pass, 12–17 June, 1856.

7. *P. labellata*, Jacquem.; De Cand. l. c. p. 565.—Western Himalaya, province Chamba, Kali Pass to Chamba, 28 June to 8 July, 1856, n. 3271.

8. *P. siphonantha*, Don; De Cand. l. c. p. 565.—Tibet, province Ladak, Yugu to Leh (right side of the Indus valley), 1–31 August,

1856, n. 1967, environs of Gia, 30–21 July, 1856, n. 1689; environs of Leh, 1–15 September, 1856, n. 43; Leh to Nurla (right side of the Indus valley), 15 September to 5 October, 1856, n. 1595; Upshi to Leh (left side of the Indus valley), 11,249–11,532 feet, 1–31 August, 1856, n. 1284; Leh, 11,532 feet, July to September, 1856, n. 1360, 961, 1887, 1827; villages on the left side of the Indus valley, 1–25 September, 1856, n. 1794; Rumbak to Kanda La Pass (south-west of Leh), 1–7 September, 1850, n. 6322; province Gnari Khorsum, Pati, *viâ* Lomorti to Poling, 5–15 September, 1855, n. 7108; province Balti, Δ Thale La to Bagmaharal (north-east of Skardo and Shigar), 30 August, 1856, n. 5950.

9. *P. versicolor*, Wahl.; De Cand. l. c. p. 578.—Tibet, province Gnari Khorsum, northern foot of the Uta Dhura Pass, across the Kiungar Pass to its northern foot, 16,200–17,600 feet, 9–12 July, 1855, n. 7340.

10. *P. carnosa*, Wall.; De Cand. l. c. p. 580?—Western Himalaya, province Garhval, Gobeser to Okimath (from the Alaknanda to the Mandagni valley), 5000–6800 feet, 14–16 September, 1855, n. 8737.

EXPLANATION OF PLATE LXXXII. Fig. 1, Branch of *Origanum Watsoni*, A. Schmidt,; 2, verticillastrum; 3, calyx, and 4, flower of the same; 5, branch of *Nepeta Sabinei*, A. Schmidt; 6, flower, and 7, calyx of the same; figs 1 and 2 natural size; figs. 2, 3, 4, 6, and magnified.

ON THE *COMMELYNA TUBEROSA* OF LOUREIRO.

BY HENRY F. HANCE, PH.D.

Mr. Sampson gathered last year, in the neighbourhood of Canton, a very pretty *Aneilema*, which—as it is, there is scarcely a doubt, the *Commelyna tuberosa* of Loureiro, (a plant not now known apparently to botanists,) and belonging, moreover, to a group which is evidently in some confusion—it may be well to describe somewhat in detail.

Aneilema Loureirii,* mihi: radicibus fasciculatis tuberoso-incrassatis, caule pubescente aphyllo v. unifoliato, foliis synanthiis lineari-lanceolatis ciliatis multinerviis 3½–5½ poll. longis 8–10 lin. latis caule

* I have thought it better to reject Loureiro's specific name, because Linnæus's species is a true *Commelyna*, from Mexico, and moreover half-a-dozen others have been so called; nor can I help believing Hamilton's Indian homonymous plant to differ from the Chinese, as will be seen by my remarks.

duplo brevioribus, perigonii phyllis exterioribus lanceolatis extus viridulis intus subcoloratis cum bracteis pedicellisque infra medium articulatis pilis glandulis luteis capitatis obsitis interioribus sepalinis bis longioribus rhomboideis lilacinis vel rarius candidis, staminibus phyllis petalinis duplo brevioribus 2 phyllis sepalinis superioribus * oppositis fertilibus antheris luteis loculis parallelis 4 reliquis *semper sterilibus!* connectivo oblongo cum antheris rudimentariis sphæricis divergentibus luteis omnium filamentis barbatis phyllis petalinis concoloribus, stylo declinato stigmate minuto aspergilliformi, capsula oblonga trigona loculis tetraspermis, seminibus oblongis sordide lateritiis rore albido obductis impresso-punctatis. In devexis ad radices montium Pakwan, extra Cantonem, vere 1867, satis copiose crescentem detexit indefessus Sampson. (Exsicc. n. 13,842.)

Several plants have apparently been confounded by authors under the name of *Commelyna scapiflora;* how many it is not easy to say. Roxburgh (Fl. Ind. i. 175) ascribes to his hysteranthous eciliate leaves, "appearing a month or two after the flowers," smooth stems (racemes), three fertile stamens, and blue anthers; in other respects his character agrees very well with ours. Royle's plate of his *Murdannia scapiflora* (Illus. Himal. Bot. t. 95, f. 3), which he considers identical with Roxburgh's plant, and also with *C. longifolia*, Wall. List, n. 5213, whilst Kunth (who makes no reference to Loureiro), on the other hand, thinks that, while it is also Roxburgh's species, it is rather *Aneilema tuberosum*, Ham.; n. 5207, of the same list, is, on the whole, a good representation of the habit of the Chinese plant, but it differs also in the number of fertile stamens, and smooth stem and leaves. Dr. Wight's *Aneilema scapiflorum* (Ic. Pl. Ind. Or. vi. t. 2073), for which he quotes with doubt the names of Roxburgh, Hamilton, and Royle, certainly looks very distinct, as he has himself observed; and a Khasia specimen in my herbarium, gathered by Drs. Hooker and Thomson, differs *toto cœlo* by its narrow, elongated, eciliate leaves, and compound, smooth raceme, with long, often verticillate branches; it has also smooth seeds, according to Wight. The limits of all are worth investigating by those who possess the requisite *living* materials; for in plants like these,—not unaptly named '*Ephemeræ*,' by the older botanists,—where the floral organs are of so fugacious a

* In this plant the odd sepaline leaf is anticous, the odd petaline posticous, in relation to the axis.

nature and so delicate a texture, some allowance must doubtless be made for inaccuracies in pictorial representations taken from dried specimens. As a voucher for the correctness of the characters I have given above, I may state that they were taken from a number of living plants, carefully dug up whilst in bloom from their native locality, and potted; and that I have examined above 150 expanded flowers. I rely chiefly on the presence of only two fertile stamens, the synanthous ciliated leaves, and the glandular pubescence (not alluded to by either of the above-mentioned authors), as distinguishing the Chinese plant. It is a profuse flowerer, and the blossoms, which are about the size of a shilling, and open between eleven and noon, and close about four P.M., being produced for a considerable number of days in succession, it has certainly a claim to cultivation, especially if the white and lilac forms are intermixed.

NOTE ON THE GENUS *HENSLOWIA*, *Blume.*

By H. F. Hance, Ph.D.

Professor Blume, who established this genus in 1850, describes the flowers as "abortu monoici" (Mus. Lugd. Bat. i. 242); whilst both Alph. De Candolle (Prodr. Syst. Veg. xiv. 630) and Miquel (Flora Ind. Batav. i. 1. 779, sub voce *Dendrotrophe*) employ the term 'monœcious' simply. Mr. Bentham, describing the Hongkong *H. frutescens* from Major Champion's specimens (Hook. Journ. Bot. v. 194), calls it "abortu dioica"; and, in his 'Flora Hongkongensis,' mentions the male and female flowers as on separate plants. Whether Blume's description is accurate, as applied to the Archipelagic parasitical species, which Miquel (op. cit. p. 1006) says must be reduced in number, I cannot say; but, so far as the South Chinese terrestrial plant is concerned, the term 'diœcious' is, strictly speaking, inapplicable. There are two forms of the plant: a purely male one, in which the flowers are furnished with a thick fleshy disk, but with no ovarian cavity; and a perfect hermaphrodite one, with a fully organized gynœcium, and stamens exactly as in the male flowers, the anthers copiously polliniferous. The term "imperfectly polygamous" would therefore, perhaps, convey a more correct idea of the true state of things. Blume describes and figures (op. laud. t. 43) the anthers in *H. varians* as "dorso

barbatæ;" and Bentham says of the Hongkong species, "stamina ut in icone Blumeana depicta." In the latter case this is certainly—and I suspect in the former too, for A. De Candolle describes the perigone-lobes as "medio intus fasciculo pilorum donati"—due to error in observation; the anthers are quite beardless; but behind each stamen, and springing from the perigone-lobe, a little above the insertion of the filament, is a fleshy scale, fimbriated or 6–8-cleft nearly or almost entirely to the base, and often adhering to the anthers, with which, however, it certainly has no organic connection. I suppose, in fact, it agrees with *Pyrularia* in this respect. The curious structure of the endocarp is well figured by Blume. In the analytical key prefixed to the 'Flora Hongkongensis,' Mr. Bentham has inadvertently described the leaves as opposite; but in the body of the work they are correctly stated to be alternate.

NOTE ON *EQUISETUM MOOREI*, *Newman.*

By Alex. G. More, F.L.S.

In his recent 'Monographia Equisetorum,'* and in the later 'Filices Europæ et Atlantidis,' Dr. J. Milde treats *Equisetum Moorei* as a variety of *Equisetum hyemale*, giving it the name of "var. *Schleicheri.*"

Dr. Milde is probably right in considering our plant a variety; for having frequently observed *Equisetum Moorei* on the coast sandhills of Wicklow and Wexford, I cannot find any further distinctive characters beyond the longer and looser sheaths, and more slender habit, which were noticed from the first by my friend Dr. Moore. In the wild state the stems are not strictly deciduous, for in sheltered situations among bushes, I have found them quite green and fresh, even so late as in the month of March; and if on the open sandhills they are more or less withered, I believe that this may be due simply to exposure.

But as regards the name, Newman's *Equisetum Moorei* is certainly prior to Milde's *Equisetum Schleicheri.* *E. Moorei* was first described by Mr. Newman in the 'Phytologist,' vol. v. p. 19 (January, 1854), a

* Novorum Actorum Acad. Cæs. Leop.-Carol. Germ. Nat. Curiosorum, tome xxxii. pars 2, p. 521 (1867).

journal which Dr. Milde does not appear to have seen, as he gives 1858 for the date of his own name, *Schleicheri*. Hence, as a variety, the plant must hereafter retain the name of *Equisetum hyemale*, var. *Moorei*.

Glasnevin, July 4th, 1868.

DISCOVERY OF *SCIRPUS PARVULUS*, *R. et S.*, IN IRELAND.

By Alex. G. More, F.L.S.

A few days ago I had the pleasure of finding *Scirpus parvulus*, R. et S., growing rather plentifully on soft mud at the mouth of the river Ovoca, just below the bridge of Arklow. It grows quite by itself on the muddy shallows which are overflowed at high water, giving a pale green tint to their surface, and forming dense beds of tiny, green tufted stems, about an inch high, its slender rhizomes interlaced and buried deeply in the mud. In habit it is quite unlike any other British *Scirpus*, for though it has been compared to *S. acicularis*, its stems are stouter and more fistulose, and its spikes of a pale greenish or whitish colour, something like those of *S. fluitans*. Our plant answers remarkably well, especially in the hyaline and cellular structure of the lower part of the stems, to the description given by Lloyd in the 'Flore de l'Ouest de la France.' There is a fair figure in Reichenbach's Icones Flor. Germ. tome viii. fig. 706, and a better in the 'Flora Danica,' xiii. 2161.

I believe that *Scirpus parvulus* has not been gathered in Britain by any other botanist since it was first found by the Rev. G. E. Smith on a mud flat at Lymington, in Hampshire. It is treated as extinct by Mr. Watson, and by the author of the British Flora. Mr. Bentham omits the species altogether, and Dr. Bromfield and many other botanists have sought for it unsuccessfully in the original station, so that I believe its discovery at Arklow will be welcome to English no less than to Irish botanists.

Glasnevin, July 8th, 1868.

[Coloured figure and full description will be given shortly.—Editor.]

HIPPOPHAE RHAMNOIDES IN IRELAND.

By Alex. G. More, F.L.S.

Last autumn, Miss E. M. Farmar, a lady botanist, who on several other occasions has supplied valuable information respecting the plants of Wexford, sent to Dr. Moore a branch of *Hippophae rhamnoides*, with the intimation that it had been gathered on the sandhills near Kiltennel, Wexford.

Fearing that the *Hippophae* might have been planted in this locality, as it has been largely used on the rabbit warrens near Rush, in the county of Dublin, I took the first opportunity of visiting Kiltennel, and, from what I have seen, I think there is no doubt that the plant is truly indigenous, and will form a notable addition to the flora of Ireland.

With directions kindly given me by Miss Farmar, I drove from Gorey station to Courtown, a small harbour on the coast of Wexford, to the north of which extends a long tract of sandhills, such as are frequent on the east coast of Ireland. Close to the pier I picked *Festuca uniglumis*, *Thrincia hirta*, var. *arenaria*, *Viola Curtisii*, *Orchis pyramidalis*, *Cynoglossum officinale*, etc., and, proceeding northwards, I had scarcely walked half a mile, when I perceived some low-growing shrubs, which, at a distance, looked like small Willows. Here was the *Hippophae*, growing in a large patch for about a hundred yards along the ridge of the sandhills close to the sea, and forming a dense thicket, under which I found that the pheasants, from the neighbouring park of Courtown, are fond of taking shelter. I soon found several more colonies of the plant, and counted altogether some eight or nine patches of this rare shrub, which extends irregularly for a distance of more than a mile along the whole line of sandhills towards Duffcarrick rocks, but does not reappear on the other side of that rocky point. When sheltered, some of the bushes attain six or seven or even eight feet in height, and, in one instance, I found a trunk which measured seven inches in diameter.

It may be objected that the Courtown sandhills adjoin a large park, where much planting has been carried on, and I did notice in one place a young *Acer Pseudo-platanus* growing with the *Hippophae*, and also a plant of *Clematis Vitalba*, both evidently self-sown, but there is

no appearance of the *Hippophae* itself having been planted, and it is too widely spread to be considered an escape or the remains of former cultivation. It grows most luxuriantly and quite irregularly on the wild slopes of the sandhills close to the sea, and with plenty of seedlings rising round the different patches. Miss Farmar has also ascertained that the plant has long been known to the inhabitants, who have always believed it truly wild.

The locality is interesting as being an outlying and apparently the most westerly station for a plant, the head-quarters of which appear to be on the shores of the North Sea and Baltic. In south France the *Hippophae* becomes subalpine, descending along the course of rivers to the sea, as seems to be the case also in Spain. It occurs in Normandy, but has not been observed on the Atlantic coasts of France or Portugal. In England Mr. Watson mentions five counties only, viz. Kent, Essex, Norfolk, Lincoln, and York. In Scotland it is believed to occur only where it has been planted.

Glasnevin, July 14th, 1868.

BOTANICAL NEWS.

Mr. Thomas P. James, the Secretary of the American Philosophical Society, has discovered the Journal of F. Pursh, the author of the 'Flora of North America,' which was found amongst Dr. Barton's papers, and is now publishing in the 'Gardeners' Monthly' of Philadelphia. It is an interesting relic.

The second fascicle, concluding the sixteenth volume of De Candolle's 'Prodromus,' has just been issued. It contains the *Betulaceæ*, by Regel; the *Salicineæ*, by N. J. Andersson and Wesmæl; the *Casuarineæ*, by Miquel; the *Gnetaceæ* and *Coniferæ*, by Parlatore; the *Resedaceæ*, by J. Mueller; and the *Cycadeæ*, *Lacistemaceæ*, *Gunnereæ*, *Ancistrocladeæ*, *Dipterocarpeæ*, *Lophiraceæ*, *Monimiaceæ*, *Crypteroniaceæ* and *Helwingiaceæ*, by Alph. de Candolle.

'Lichenes Cæsarienses et Sagiensis Exsiccati,' by Charles Dubois Larbalestier, B.A., St. John's College, Cambridge, is the title of a dried collection of Lichens, of which the second fascicle (Nos. 51 to 100) has been issued. The title-page states that it was printed at Jersey, by G. F. Perrot, 19, Royal Square; but no publisher or agent's name is given.

J.D. Hooker anal. W Fitch lith

ON TWO NEW GENERA OF SMILACINEÆ.

By Berthold Seemann, Ph.D., F.L.S.

(Plates LXXXI. and LXXXIII.)

(*Continued from p.* 194.)

Thinking that one or the other of the two species of *Smilax* which Mr. Horace Mann enumerates in his recently published List of Sandwich Island Plants might belong to my new genus *Pleiosmilax*, I wrote to the author about them, and at the same time communicating to him my doubts that what he took for *S. anceps*, of Willd., was probably not that species. With his usual courtesy he replied, in a letter dated Cambridge, Mass., June 25th, as follows:—"In answering your letter about *Smilax*, I must begin by acknowledging that what has been put on record respecting the Sandwich Island species in my 'Enumeration,' is not entitled to much confidence. In the first place, I have never examined *Smilax anceps* from Willdenow's locality, if I have from any other; in the second place, Remy's n. 157 is certainly not what Willdenow describes as *S. anceps;* again, Mann and Brigham's n. 222 is not what Kunth describes as *S. Sandwichensis*, and both for the very sufficient reason that they have 18 stamens, and are, as far as I *now* see, the same thing one with the other. There is nothing in our herbaria here which answers to your *Pleiosmilax Sandwichensis*, in case it never has more than 12 stamens, and no spiny plant which would answer to *P. Menziesi*. The only specimen of your Vitian *Smilax* (n. 631) is without flowers, and as you imply by the "*ex parte*" that there was something mixed with that distribution [*Smilax* (?) *trifurcata*, Seem., with trifurcate peduncles and cylindrical receptacles—B. S.], I do not know which of the two it may be. The above completes the list of our Polynesian Smilacineæ."

I have no doubt that the species with 18 stamens is identical with my *P. Sandwichensis*, which may have sometimes three times as many stamens as perigonal leaves. In my Viti Flora the character will be thus extended, and also a *lapsus calami* be corrected, ascribing (p. 193) 10 sterile stamens, instead of 6, to the female flowers. The genus seems to be peculiarly Polynesian,—at least, on hastily looking through our herbaria, I have not found any congeners from elsewhere. But

a closer examination may bring to light some additional extra-Polynesian species. It has been so long assumed that *Smilax* has always 6 stamens, that nobody has taken the trouble to look if any species had more or fewer. I have pointed out several species which have more than 6, and in my 'Botany of the Voyage of H.M.S. Herald,' p. 420, one which has fewer than 6, and which I now make the type of a new genus; viz.:—

OLIGOSMILAX, Seem. (gen. nov.). Flores diclini. Fl. ♂: Perigonium corollinum, 3-phyllum, foliolis erectis subconnatis, æstivatione valvatis. Stamina 3, monadelpha; antheræ ovatæ, acutæ, longitudinaliter dehiscentes. ♀ Fl. ign. Bacca subglobosa, 3-(per excessum 4-)loculare, 3–4-sperma. Semina ovata. Embryo antitropus, minimus, in extremitate albuminis cornei umbilico opposita inclusus.—Suffrutex Chinensis, inermis, scandens, glaber, ramis striatis, ramulis subangulatis, foliis cordatis v. ovatis acuminatis 5–9-nerviis; umbellis axillaribus solitariis; pedunculis ebracteatis. Species unica:—

1. *O. Gaudichaudiana*, Seem. (Tab. LXXXIII.).—*Smilax Gaudichaudiana*, Kth. Enum. v. p. 252; Benth. Fl. Hongk. p. 370; *S. Hongkongensis*, Seem. Bot. Herald, p. 420.—Hongkong, trailing over shrubs (Hance! Seemann!). Also collected in southern China by Gaudichaud and Besser.

This plant, an analysis of which was made by Dr. J. D. Hooker, I originally intended to figure in my 'Botany of H.M.S. Herald,' but was unable to do so, as the full number of 100 plates had already been reached.

EXPLANATION OF PLATE LXXXIII. (representing *Oligosmilax Gaudichaudiana*, Seem., from specimens kindly lent by Kew Museum).—Fig. 1. A branch with male flowers. 2. Male flower-bud. 3. The same laid open. 4. An anther. 5. Umbel with ripe fruit. 6 and 7. Ripe fruit cut across. 8 and 9. Seeds. 10. Seed cut longitudinally. 11. Embryo. Figs. 2, 3, 4, 6, 7, 8, 9, 10, and 11 *magnified*.

NOTES ON THE FLORA OF SUSSEX.

BY W. B. HEMSLEY, ESQ.

(*Concluded from p.* 196.)

To facilitate reference, those species in the following enumeration that are new to the county, either as segregates or otherwise, have an (*) placed before them, and those considered doubtful by Watson, a (?).

? *Thalictrum flavum*, L. I have seen this on the banks of the Arun, near Horsham, and Mr. B. Helyer has specimens collected last year at Houghton and Burpham, also on the Arun. In the herbarium of the late W. Borrer is a specimen, probably collected in Sussex, but without any habitat.

**Ranunculus Baudotii*, Godr. Birdham and Fishbourne, Herb. Borrer.

**R. trichophyllus*, Choix. I have a specimen from Albourne, and in Herb. Borrer is a specimen labelled, "In a pond by the roadside up the hill, between Wiston and Chanctonbury." In Borrer's manuscript notes† there is another habitat recorded, "Beeding Pastures."

**R. floribundus*, Bab., and **R. peltatus*, Fr. Both occur, the latter being the commoner and found throughout the county.

**R. Drouetii*, F. Schultz. Erringham, Herb. Borrer.

**Aquilegia vulgaris*, L. Found in numerous localities all over the county, and in some places in the greatest profusion.

Berberis vulgaris, L. Not recorded by Watson, and most likely not indigenous in the county, although it is met with in two or three places on the north side of the Downs, and is occasionally seen in hedges. There is a specimen in Herb. Borrer from the Downs, near Clayton Holt, where it still exists, but there is only one bush, and that a very old one.

? *Lepidium latifolium*, L. Doubtless an accidental introduction. The only habitat recorded is "by the Lavant, near St. Mary's Hospital, Chichester," where I believe the Rev. W. W. Newbould first detected it. In Herb. Borrer there is a specimen from the same locality collected by "J. R.," and dated 1843, since when it has not to my knowledge been rediscovered.

? *Cardamine impatiens*, L. This has no longer a claim to be included in our list. It was formerly found near Slinfold Parsonage, the residence of Dr. Manningham, a contemporary of Dillenius, and named by him in the third edition of Ray's 'Synopsis.' Mr. Borrer collected specimens there in 1839, but it has since been sought for in vain, and has probably quite disappeared. Many other stranger-plants have been found at different times in the vicinity of Slinfold, supposed to be escapes from Manningham's garden.

† Kindly placed at my service by his son W. Borrer, of Cowfold, Esquire.

? *Erysimum cheiranthoides*, L. I have frequently seen this plant in cornfields, and several localities have been communicated.

Sisymbrium Sophia, L. Watson includes this without question, but I know of no habitat for it.

? *Matthiola incana*, R. Br. There is probably no doubt that this plant formerly grew in the vicinity of Hastings, although all traces of it have long since disappeared. In Dawson Turner's Herb., now at Kew, there is a specimen from thence dated 1806. Borrer's specimen is labelled, "Cliffs E. of Hastings," and in his manuscript notes I find, "scarcely accessible."

? *M. sinuata*, R. Br. I can find no reliable record of this plant having been found in the county. Hooper—Watson's authority, I presume—is not always trustworthy.

**Dianthus deltoides*, L. I have specimens of this which I found on the railway near Hassock's Gate station, and Mr. Helyer found it near Shoreham.

? *Silene Anglica*, L. I have found it in great abundance in different parts of the country, and I have seen Sussex specimens collected by Borrer, Bromfield, and others.

? *S. noctiflora*, L. I have seen one specimen only, and that is in Herb. Borrer, from "Seddlescoombe, near Poynings, 1814."

**Arenaria leptoclados*, Guss. Appears to be the commoner form on the Downs, etc. The Rev. W. W. Newbould has kindly directed my attention to a note in Babington's 'Flora of Cambridgeshire,' from which it appears that the late Mr. Borrer not only collected the plant in Sussex as long ago as 1844, but was also the first to notice it in this country.

**Sagina nodosa*, E. Mey. Omitted by Watson, but it is met with in several parts of the county. I have seen it in the forests, and Mr. Dyer reports it from the "Downs, near Brighton," and Jenner says it is frequent in the neighbourhood of Tunbridge Wells.

Linum perenne, L. In Mrs. Merrifield's 'Natural History of Brighton,' we are informed that this grows in the vicinity of Brighton, but that is a mistake, I believe.

? *Lavatera arborea*, L. Found near the sea in several places, but always near cottage gardens.

? *Erodium maritimum*, Sm. Formerly found near Bracklesham by Dillenius (Ray Syn. ed. 3), and Bognor Rocks by a Mr. Hill, but I

find no reliable record of its rediscovery. Mrs. Merrifield, however, says it is common on the low cliff to the west of Shoreham!

? *E. moschatum*, Sm. "Rocks, near Hastings," according to Hooper in his Bot. Sus., but if so, it disappeared long ago, and should be expunged from the list. In Borrer's Herb. there is a specimen labelled "Pulborough,—escaped, I suppose,—called 'Wild Musk,'" 1836.

? *Geranium pyrenaicum*, L. Only solitary plants of this have been found.

? *G. lucidum*, L. One plant was found by Borrer near Lewes, and that undoubtedly an escape or outcast, like many others in the environs of that town.

Polygala calcarea, F. Sch. Unknown to me, but Watson adduces it without a doubt.

? *Medicago falcata*, L. Watson enumerates this as a doubtful Sussex plant, and Syme, in Eng. Bot., says it is found in the county, but on whose authority it is not stated.

? *Melilotus vulgaris*, Willd. Now quite established on the railways and in other places, *e.g.* between Hassock's Gate and Burgess Hill.

**Onobrychis sativa*, Lam. Often seen on railway embankments, near chalk pits, and in similar situations.

**Vicia sylvatica*, L. In the 'Guide to Hastings,' and in Mrs. Merrifield's Nat. Hist. of Brighton, this plant is mentioned as growing near these towns, owing no doubt to some error.

V. Bithynica, L. In Borrer's Herb. there is a specimen with the following note:—"By the cliff along the road between Shoreham and Southwick. Prob. lost, 1841," and I am not aware that it has been found subsequent to that date.

The following additional named forms of the genus *Rubus* are from the county, most of which I have seen, but I cannot say that I am able to distinguish many of them myself.

**Rubus suberectus*, Anders. Ashdown Forest, etc.

**R. fissus*, Lindl. Forest Row, Herb. Borrer.

**R. plicatus*, W. and N. Near Midhurst, St. Leonard's Forest, Forest Row, etc., Herb. Borrer. Var. *fastigiatus*, Tilgate Forest, Herb. Borrer. In Eng. Bot. Suppl., under t. 2714, is the following note by the late Mr. Borrer:—"Not rare in the forests of Sussex, in heathy and somewhat boggy places, chiefly on the banks of streams."

**R. nitidus*, Bell. Salt. Henfield, Herb. Borrer.

**R. rhamnifolius*, W. and N. St. Leonard's Forest, Woodmancote, Henfield and Albourne, Herb. Borrer.

**R. thyrsoideus*, Wimm. Westend Lane, Henfield, Herb. Borrer.

**R. Grabowskii ?*, Weihe. Henfield, Herb. Borrer.

**R. carpinifolius*, W. and N. Henfield, Herb. Borrer.

**R. Koehleri*, Weihe. Not uncommon in the county. Var. γ. (*R. pallidus*, Weihe) Frant Road, Balcombe, and Henfield, Herb. Borrer.

**R. Guntheri*, Weihe. Henfield ?, Herb. Borrer.

**R. Balfourianus*, Blax. Henfield, Albourne, Newtimber, and near Eridge, Herb. Borrer.

R. Hystrix, Weihe, *R. rudis*, Weihe, and *R. incurvatus*, Bab., are given in Watson's Suppl., but I have seen neither specimens nor habitats recorded.

The following names are not given in the Suppl., most of them being of later date.

**R. rosaceus*, Weihe. West Chiltington and Woodmancote, Herb. Borrer.

**R. pygmæus*, Weihe. Near Eridge, Herb. Borrer.

**R. diversifolius*, Lindl. Henfield, Herb. Borrer.

**R. Lejeunii*, Weihe. Sussex, Syme, Eng. Bot. ed. 3.

**R. althæifolius*, Host. Steyning and Henfield, Herb. Borrer.

**R. tuberculatus*, Bab. Haycroft hedge, Henfield, Herb. Kew, coll. Borrer.

Fragaria elatior, Ehrh. "Amberley, 1806, Herb. D. Turner." "In plenty near the centre of Charlton Forest, but scarcely indigenous," Borrer, Herb. Kew. E. Marden, Didling, etc., Borrer's manuscript notes.

Potentilla argentea, L. Watson gives this without doubt as a Sussex plant, but I have not succeeded in finding it, neither have I any habitat from any source. At all events it must be very rare, and I think it probable that Forster's (Fl. T. W.) localities are in Kent.

**Epilobium tetragonum*, L., and **E. obscurum*, both occur. The latter I have found in various localities, and in Borrer's herbarium are specimens from Henfield and Barcombe.

? E. lanceolatum, S. and M. Watson gives this with a doubt, and I have reason to believe that Mr. Borrer suspected that it was only an escape from his garden. His specimen is labelled "Hedge by the footpath at Barrow Hill, Henfield."

**Herniaria glabra*, L. Labelled *H. hirsuta*, "coast of Sussex," in Herb. D. Cooper, "in Dr. Forbes Young's herbarium," now at Kew; must be considered very doubtful, and is the only record of its being found in the county that I have seen.

? *Sedum reflexum*, L. I have met with it in many places on old walls; and by the roadside near Stonepound gate, Clayton, there is great abundance of it amongst the furze for about fifty yards.

? *Ribes nigrum*, L. I have never met with this, even in a semi-wild situation.

? *R. Grossularia*, L. Often seen along brooks and streams, etc., but never sufficiently remote from gardens to warrant its being considered indigenous.

**Drosera Anglica*, Huds. In Mr. Borrer's manuscript notes I find the following:—"Ashdown Forest, south-west of Hartfield, Mr. Shuter;" and in the "Adversaria Petiveriana," published in the 'Phytologist,' another station is given, "Bog on Westfield Down, Mr. J. Sherard;" but Mr. Watson had no habitat for this county, and I am afraid it was only *D. intermedia*, which is common on all the bogs.

? *Fœniculum vulgare*, All. Cliffs on the coast, and ruins in several localities.

? *Lactuca scariola*, L. Eastwall, Chichester, Rev. W. W. Newbould's manuscript (Watson). "I never saw a Sussex specimen," Borrer. I am not aware that it has been seen elsewhere in the county. [After this was in type, the Rev. W. W. Newbould most opportunely apprised me of the existence of the following note which I had unfortunately overlooked:—"The county of Sussex, the only county or province in which this species had been reported, must now be expunged, the Rev. W. W. Newbould having informed me that it was an error of name."—Watson's Cyb. Brit. iii. p. 452.]

**Crepis biennis*, L. I find the following in Borrer's manuscript notes:—"Cornfield on the top of Barncoombe Hill, near Brighton." Of course it can only be considered as an accidental introduction.

The distribution of the segregates of *Arctium* was little known at the time the Supplement was published, and only the aggregate was reported from Sussex.

**A. tomentosum*, Pers. Near Winchelsea, 1866; and in Herb. Borrer, from Newhaven Bridge.

**A. minus*, Schk. This form is rather common.

**A. majus*, Schk. Also common.

? *Carduus eriophorus*, L. I know no Sussex station for this.

Tanacetum vulgare, L. The sign of doubt is placed after this in Watson's Supplement; but there is no doubt, I think, that it is indigenous on the banks of rivers, both in the east and west.

? *Inula Helenium*, L. I have numerous localities, including the following from Borrer's manuscript notes:—"About Woollavington, Mr. Drewit; in a field called 'Old Bottom,' at Rackham, and among bushes by the lane leading to Amberley village; meadows at Oreham, Henfield, Mayfield." It still exists in most of these localities, and is, I should say, an undoubted native.

? *Campanula Rapunculus*, L. Pulborough, Borrer's manuscript notes; since sought there several years in succession, but not found; and perhaps never more than a stray plant or two found.

? *Pyrola rotundifolia*, L. This is reported to have been found in Charlton Forest by a Mr. Hill (Blackstone Spec. Bot.), but Mr. Borrer and others have thoroughly explored the forest without finding a *Pyrola;* so it must be struck out of our Flora. The only *Pyrola* in the county is *P. media*, and a single station for that, discovered, I believe, by Mr. Borrer, in St. Leonard's Forest, where it still exists in tolerable plenty.

Cyclamen hederifolium, L. "Tivoli wood, near Hastings, Mr. W. W. Saunders, 1850. Only one plant, destroyed in the formation of the reservoirs, 1852," Herb. Borrer. I might add that Mr. Borrer considered it a genuine habitat.

**Erythræa latifolia*, L. In Borrer's herbarium is a specimen from "Cliffs, west of Cuckmere Haven." I have not found it myself.

? *Villarsia nymphæoides*, Vent. Certainly wild, I should say, in the brooks between Lewes and Barcombe; but in the other stations reported most likely planted.

? *Atropa Belladonna*, L. In many places on the Downs in the western divisions of the county.

? *Veronica verna*, L. "East Hill, Hastings," G. Maw, 1849. A mistake, no doubt. Borrer sought it there and could not find it.

? *V. Buxbaumii*, Ten. This has become a very common weed in many places; and, like *Diplotaxis muralis*, since I began botanizing in the county, has spread with extraordinary rapidity.

Sibthorpia Europæa, L. The only habitat for this plant in the

county, and where it grew in great profusion, has been destroyed, so we have a very interesting loss to chronicle. Waldron Down, if I mistake not, was the most easterly station for it in England.

? Linaria repens, Ait. "Miss Smith, of Sutton, tells me she planted this on the wall where I found it," Borrer, ms. It has since disappeared, I am informed by the Rev. F. H. Arnold.

? Salvia pratensis, L. This has no claim whatever to be included in the flora of Sussex, no authentic station having been recorded.

? Mentha rotundifolia, L. The following are all the stations known to me, none of which is satisfactory:—Henfield Churchyard, Herb. Borrer; near Chichester, Trevelyan; Arundel Park, Bot. Sussex.

? Mentha piperita, L. Near Henfield, Herb. Borrer; Hayward's Heath, etc.; Messrs. Edwards and Helyer. By the road from Chichester to Arundel, between Ball's Hut and Avisford Hill, Bot. Suss. *M. sativa, β. rubra*, is found in several localities.

**Thymus Serpyllum*, L. *T. Chamædrys*, Fr., is much the commoner species in the county, but this is also frequent in the Downs.

? Ajuga Chamæpitys, Schreb. The following is the only indication of its growing in the county:—Cornfields about Tunbridge Wells, Forster. "Not in Sussex," J. Woods, Borrer manuscript notes.

? Marrubium vulgare, L. Found in several places, but always the remains of or near cultivation.

? Myosotis sylvatica, Ehrh. The late Mr. Borrer never met with this in the county, and believed the plant, so called by Mr. Trimen, to be the large-flowered variety of *M. arvensis;* but Mr. Trimen assures me that it is the true plant which he collected, and still has a specimen of, and that he found it in several small copses in the parish of Warnham. In the late Dr. Bromfield's manuscript notes I find the following observation:—"I saw a specimen of *Myosotis sylvatica*, found by Dr. Harward, near Hastings." I have not met with it myself, but I do not hesitate to include it on Mr. Trimen's authority.

Ballota ruderalis, L. Given by Watson, without doubt, as a native of Sussex, but I have only seen *B. fœtida*, and Borrer's specimens are the latter.

? Symphytum tuberosum, L. This is only known from the neighbourhood of Slinfold Parsonage, where so many aliens are found.

? Anchusa sempervirens, L. "Plentifully on a bank between Lewes and Southoven, Mr. Woollgar," Herb. Borrer. This is the only

station reported. I believe it is still found near Lewes, but it cannot be admitted, even as a naturalized plant.

? *Asperugo procumbens*, L. Stated in the third edition of Ray's Synopsis to have been found by Boxley on the road to Pevensey Marsh, but I think it should be expunged.

? *Cynoglossum montanum*, Lam. It is extremely doubtful if this was ever found in the county. Mr. Forster's "Lanes near Tunbridge Wells" were most likely in Kent.

**Statice occidentalis*, Lloyd. "Chalky cliffs a little westward of Rottingdean," Herb. Borrer. Also reported from Shoreham, but Mr. Borrer "never saw it there." I have not seen it growing.

? *Chenopodium glaucum*, L. Mr. Watson had no special locality for this in Smith's Cat.; and I have neither discovered the plant nor any other record of its occurrence in the county.

? *C. urbicum*, L. The variety called *intermedium* is occasionally met with in waste places.

? *C. botryoides*, L. I doubt if this has ever been found in the county.

? *Atriplex arenaria*, Woods. Found in several places on the coast; in Herb. Borrer is a specimen from Camber Sands.

? *Polygonum Bistorta*, L. I have seen this in several places, and have received information of many other stations in the county. The following are from Borrer's manuscript notes:—"Near Midhurst," "Crayley," "West-end, Henfield, in a meadow called Hayler's Field;" and at Wickham, Hurstpierpoint."

? *Empetrum nigrum*, L. The late Mr. Borrer found two plants of this in the Wild Brooks on the Greatham side of the ditch that bounds that and Amberley parishes; but it no longer exists there, and must now be expunged from our list. Whether it was truly indigenous there or not is somewhat doubtful, but Mr. Borrer fully believed that it was not brought there by human agency.

? *Euphorbia palustris*, L. Discovered by Mr. J. Edwards in Blackbrook Wood, Westmeston, in whose company I collected a specimen. It is certainly wild in this station, but at Slinfold most probably introduced.

? *Euphorbia Portlandica*, L. Among Borrer's manuscript notes I find remarks on several plants in the handwriting of the Rev. G. E. Smith, on whose authority I presume Watson gives it, but with a

doubt. The notes are headed "ascertained" and "doubtful" Sussex plants; and he observes under this, "The habitat, sandy coast about Thorney Islands, is doubtful," and Borrer says it was never found in the county.

? *Populus alba*, L. Old trees occasionally met with in woods, but perhaps always planted.

? *Salix alba*, L. It is doubtful whether the true *alba* is a native.

? *S. Helix*, L. "Steyning, planted?" Herb. Borrer, is all I know about it.

? *S. acuminata*, L. I know no station for this, perhaps only found in the willow-beds.

? *S. pentandra*, L. May be expunged, I think, without any doubt.

? *Orchis fusca*, Jacq. Another of Smith's "doubtful" Sussex plants.

? *Fritillaria meleagris*, L. Said to have been found in a meadow north of the church at Hurstpierpont, but it has not been found there of late, nor in any other part of the county.

Colchicum autumnale, L. Not marked from Sussex in Watson's Suppl., but in Borrer's manuscript notes is the following station:—"In a meadow by Clay Lane, Storrington West Down; since lost."

Potamogeton filiformis. Watson gives this without a doubt, but the true *P. filiformis* of Nolte has not been found in the county; and *P. pectinatus* must have been the segregate species intended.

? *P. zosterifolius*, Schum.; (?) *P. heterophyllus*, Schreb., and (?) *P. plantagineus*, Ducr., are reported from the county, but on very questionable authority; and the late Mr. Borrer, in the 'Phytologist' for 1854, expressed strong doubts as to their having been found. No well authenticated and particularized stations are on record.

**Ruppia rostellata*, Koch. I have this from East Sussex, and in Borrer's herbarium is a specimen from Ford in the western division.

? *Acorus Calamus*, L. "In a pond on Duncton Common, probably planted," Herb. Borrer; and I have seen it in a pond in Arundel Park, where it was doubtlessly planted also.

**Agrostis Spica-venti*, L. Southwick, Borrer's manuscript notes; and I have found it in cornfields about Clayton, etc.

**Festuca arundinacea*, Schreb. Found in many places near the sea.

? *Polypodium Dryopteris*, L. No other record beside Moore's "Near Danny" has reached me, and that Mr. Borrer doubted.

? Asplenium viride, Huds. The only known station for this was a plant on Danny House, where it was most probably introduced accidentally or otherwise.

A. marinum, L. This formerly grew at Hastings, but now belongs to our list of lost species.

ADNOTATIONES DE FILICIBUS NONNULLIS CHINÆ INDIGENIS.

AUCTORE M. KUHN.

Cl. Hance, in pag. 176 hujus libri, describit novam *Woodwardiæ* speciem in imperio Sinensi collectam, quæ ex diagnosi ab auctore data congruere mihi videtur cum *Woodwardia auriculata*, Blume, Enum. Plant. Javæ, p. 196, qui in observatione de specie hæc dixit: "A *W. orientali*, Sw., et *W. radicanti*, Sm. (non Sw.), differre videtur pinnarum lacinia infima abbreviata et quasi auriculiformi, rhachique præsertim ad insertionem pinnarum paleacea." Sed ex brevi Blumei diagnosi et ex hac observatione dubitavissem, num planta Sinensis cum Javanensi congrueret, nisi in derelictis defuncti Mettenii manuscriptis, qui specimen Blumeanum vidit, ampliorem diagnosin invenissem, quæ ex mea sententia exacte cum *W. angustiloba*, Hance, congruit. Cl. Mettenius his verbis *W. auriculatum*, Bl., circumscripsit:

"Folia coriacea, siccitate olivacea, supra glaberrima, infra cum rhachi paleis membranaceis ferrugineis pilisque paleaceis multifidis villosa; lamina ultra 2′ longa sublanceolato-oblonga, acuminata, pinnatisecta; segmenta approximata, oblique patentia, sursum curvata vel stricta, ad 8″ longa, $1\frac{1}{2}$″ lata, elongato-lanceolata, acuminata, pinnatipartita, apice argute serrata; laciniæ approximatæ, sinubus acutis distinctæ, ala $1\frac{1}{2}$–2‴ lata confluentes, falcato-oblongæ, acutæ, argute serrulatæ, basales lateris superioris abbreviatæ; maculæ inter arcum Pleocnemiæ costalem et sinum et ad costulas 1-seriatæ; radii liberi; sori utrinque ad costulas 2–5, costulæ approximati; indusium coriaceum, fornicatum, fuscum. Differt ab *W. Japonica* præter indumentum forma laciniarum."

Ex hac Metteniana diagnosi sine ulla dubitatione species congruentes esse puto. Cl. Hooker in opere 'Species Filicum,' vol. iii.

p. 67, *W. auriculatam*, Bl. inter synonyma *W. radicantis*, Sm. enumerat, sed in observatione de hac specie annotat, specimina Javanica a cl. Thos. Lobb collecta siccitate obscurius colorata esse atque nervis minus anastomosantibus prædita. De indumento et forma laciniarum nihil dicit. Ex defuncti Mettenii ultima sententia speciminum copia herbarii Hookeriani inspecta *W. auriculata*, Bl., varietatem notabilem *W. radicantis* sistit magis distinctam, quam plantæ in America crescentes, quas cl. Hooker (Spec. Fil. vol. iii. p. 67) varietatem habuit, sed a cl. Baker in Hook. Syn. p. 188 a specie propria non separantur. Varietas igitur hoc modo constituenda est:

Woodwardia radicans, Sm., var. *auriculata*, (Bl.) Metten.; folia cum rhachi infra paleis ferrugineis pilisque paleaceis multifidis villosa; laciniis falcatis linearibus, basalibus inferioribus abbreviatis.—*Woodwardia auriculata*, Blume, Enum. p. 196. *W. radicans*, Hook. Spec. Fil. vol. iii. p. 67, et Syn. p. 188, ex parte, quoad spec. Javanica (t. Metten. ms.). *W. angustiloba*, Hance in Seemann, Journ. Bot. 1868, p. 176, e descr.—Java; China.

Fortasse hæc varietas in aliis quoque terris Asiæ orientalis invenietur.

De *Adianto Cantoniensi*, Hance (Ann. Sc. Nat. Sér. iv. t. 15. p. 229; Hook. Syn. p. 114, et Hance in Seemann, Journ. Bot. 1867, p. 260), jam prius in Mohl et De Bary, Botanische Zeitung, 1868, p. 233, locuti sumus, atque examinatis exemplaribus *Adianti Capillus-Junonis* ex herbario horti Petropolitani æque ac *Adianti Cantoniensis*, Hance, Herb. n. 7542, demonstravimus plantam Cantoniensem varietatem ex nostra sententia *Adianti Capillus-Junonis* Rupr. esse.

Asplenium incisum, Thunb. (*A. elegantulum*, Hook.), adhuc præcipue in insulis Japonicis et in insula Tshu-San (Chusan) a multis botanicis collectum, nuperrime verisimiliter ex agro Pekinensi a Sir W. Staunton reportatum vidimus.

Asplenium Saulii, Hook. in Blakist. Yang-Taze App. 363, e speciminibus originalibus cum *A. variante*, Wall., congruit, quod etiam in China boreali a cl. Fischer (!) et nuperrime in insulis Japonicis a cl. Wichura et Schottmüller (!) æque atque a cl. Oldham (*A. sepulchrale*, Hook. Syn. Fil. p. 213 t. spec. orig.!) collectum est. Ex brevi diagnosi ab hac specie *A. Blakistoni*, Baker (Hook. Syn. Fil. p. 216), vix diversum videtur.

Pteris insignis, Mett.; rhizoma deest; folia chartacea, siccitate oli-

vaceo-viridia, glaberrima, subdifformia, pinnatisecta cum impari; petiolus 4–?″ longus, cum rhachi stramineus, lævis; rhachis $\frac{3}{4}$–1$\frac{1}{2}$′ longa, ovata s. ovato-oblonga; segmenta 6–12-juga, petiolata, patentia; sterilia ad 8″ longa, ultra 1″ lata, fertilia 4–6″ longa, 4–6‴ lata, e basi rotundata s. cuneata, linearia s. elongata, longius breviusve acuminata, integerrima; superiora decrescentia, sessilia, terminalia supremis lateralibus conformia, costæ supra planiusculæ; nervi patentissimi, furcati, circiter $\frac{1}{2}$‴ distantes; margo revolutus, latiusculus, integerrimus; paraphyses numerosæ.—Hongkong (Hance, n. 79).

P. tæniosæ, T. Sm., proxima, sed petiolo lævi, segmentis elongatis satis recedens.

In herbario Francavilleo ante paucos dies speciem generis Polypodii adhuc indescriptam a cl. Mettenio *Polypodium Chinense* nominatam vidimus, cujus diagnosis nunc sequitur.

Polypodium Chinense, Mett.; rhizoma repens, elongatum, crassitiem pennæ corvinæ subadæquans, paleis membranaceis amplis, pallide rufescentibus, late ovato-oblongis, lanceolatis, margine pallidiore erosodenticulatis squamosum; folia distantia, membranacea, pallide virescentia, pellucida, glabra, brevi petiolata, petiolo 9‴ longo, 5–11″ longa, 10–12‴ lata, lanceolata, utrinque æqualiter attenuata et acuminata, integerrima; costulæ tenerrimæ, subconspicuæ, subdivaricato-flexuosæ; maculæ *Drynariæ* translucentes appendicibus numerosis divaricato-ramosis apice manifeste incrassatis, 4–5-seriatæ, paracostales hinc et sequentes monosoræ, marginales et intramarginales minores; sori in basi radii e maculis costalibus emissis utrinque ad costam uniseriati eique approximati, superficiales, rotundati; paraphyses nullæ.—China, Canton (Gaudichaud!); Fokien (De Grijs in Hb. Hance, 6786!); Pootoo (Fortune, 181!); Tshu-San (Herb. Godet!).

A *Polypodio normali*, Don, quocum cl. Hooker in Spec. Fil. v. p. 69, var. *β*. (t. spec. ex Mett. ms.) hanc speciem conjungit, conditione palearum rhizomatis, nervatura, sororum dispositione, defectu paraphysium recedit.

Postremo *Woodsiæ* (Sect. *Euwoodsiæ*) speciem commemoro, quæ a Schottmüller a. 1861 prope Tsheu-Fu (Cheefoo) collecta a beato Mettenio *Woodsia macrochlæna* nominata est. Differt enim ab omnibus reliquis speciebus indusio membranaceo quadrifido, lobis margine longissime ciliatis, persistente; segmentis infra solutis, supra adnatis. Totam hujus speciei diagnosin alio loco dabimus.

Berolini m. Jul. 1868.

THE DARWINIAN THEORY.—III.

(*Concluded from p.* 213.)

There are some persons who propose that the Creator may have given the first start to life, but may have afterwards permitted the varieties of life to be effected by *secondary causes*, for that is the language in vogue for the occasion. We must, therefore, examine the meaning of this proposition, which implies that matter left to itself should be able to transform itself into innumerable varieties of organization, and that an elephant may ultimately have been derived, by a long series of transformations, from a seaweed. Granting secondary causes in full activity, as indeed they always are, yet secondary causes do not perform miracles. If an oyster were generated from a seaweed, which is bringing things a little nearer, yet secondary causes can have effected this only by willing, designing, foreseeing, and elaborating the many intermediate changes. In short, all forms of wonderful contrivances, such as we can never imitate, must have been planned by intellect, and that intellect* must reside in matter, if secondary causes have accomplished these wonders. Secondary causes do not think; they do not, by innate intelligence, command an intuitive knowledge of all the sciences, nor have they power to apply their knowledge as they choose; they can only act as servants to the established laws of nature, and must keep themselves within the boundaries of actual material existence, following impulses where they cannot control. If secondary causes can

* "Pour nous, le génie de l'architecte devance la construction de l'édifice, et les matériaux de celui-ci n'engendrent nullement l'intelligence qui préside à son admirable disposition" (p. 120).

These excellent words are from Pouchet's 'Hétérogénie,' a work of great merit, for the clearness of its style and the depth of its information. The main principle which he advocates would, of course, be contested by all but the disciples of that school of which M. Pouchet is one of the most distinguished teachers. This learned writer is one of those physiologists who, following with modifications the doctrine of Stahl (1720), attribute a sort of intelligent spirit to matter. The adherents of this theory, stated in different forms, are, in France, usually called the school of Montpellier, in contradistiction to that of Paris, which is generally understood to advocate *organicisme*, that is, that life is the result and sequence of organization. Of the Paris school, Lamarck, Bichat, Broussais, Bérard, are conspicuous names; with M. Pouchet may be classed in general sentiment Redi, Treviranus, Rudolph, Oken, Morren, Nordmann, and perhaps Quatrefages, though a firm opponent of spontaneous generation. We may conclude this note with some remarkable words of Pouchet:—"Il est évident qu'un agent coordonnateur domine toutes les manifestations vitales, mais aucune des écoles ne l'a suffisament défini" (p. 117).

do more than this,—if they can transform one thing into another, that is, can effect a metamorphose,—if they can confer life where it did not previously exist,—then they effect spontaneous generation; and this is what several Transmutationists claim for matter. They affirm that spontaneous generation is a fact in nature, and, moreover, they boldly declare that there is no other alternative; and that for the origin of life and species we must select either creation or spontaneous generation, for any other supposition, they say, is illogical and impossible.

M. Pouchet here throws down the gauntlet, and openly defies the physiologists* to find another alternative; either creation, says he, or spontaneous generation. No other medium of existence is possible; and the logic of this is sound, for all other substitutes for spontaneous generation in the school of transmutation are but words of vain pretence, which are found to mean nothing on a close examination.

Mr. Darwin has his great contrivance of *accidents*, "a variation would be beneficial," and so that accidental variation is taken up, and worked out by natural selection into a new species. Thus, then, in his theory every organized being in the world is the result of innumerable accidental changes; an eagle's eye, Mr. Darwin assures us, is the production of favoured accidents; the proboscis of an elephant, the wings of a bird, the organization and character of a lion, the tail and fins of a fish, the instincts of the honey-bee, and the form and intellect of man, are all "favoured" accidents. There was no design, plan, or intention to form any animal or plant; but beneficial changes have been preserved, and so we see things as they are. Nevertheless, Mr. Darwin objects to spontaneous generation, as the modern state of science does not confirm its pretensions according to his opinion; but to spontaneous *production* he can have no objection, as his whole system rests on it; or, if he should object to the word spontaneous, will he explain to us the difference, as a matter of fact, between accidental production and spontaneous generation? and will he show us how a long-continued system of advancing and improving organization, never ceasing, and going on to perfection, according to his theory, can be only a long chapter of accidents?

* "Nous défions qu'on sorte de cette alternative, ou la création instantanée et miraculeuse d'un certain nombre d'animaux parfaits; ou l'évolution successive, c'est-à-dire l'idée de Lamarck, modifiée dans le sens des connaissances nouvelles, qui résument à notre époque, d'un côté la géologie et de l'autre l'anatomie philosophique" (p. 182).

M. Pouchet, a more thorough disciple of Lamarck than Mr. Darwin, feels this difficulty, and thus expresses himself in discussing it: —"But there is a difficulty which shocks the understanding; how shall we explain an ascending and progressive system of varieties? Must we believe in any final purpose, in an object determined beforehand? We do not think so. *Finality is a sort of divine prevision*, and the world, according to this hypothesis, is still in tutelage; we prefer believing in a creative intelligence." And he then gives, as an instance of this, the increase of the human skull under the influence of civilization, "so that an organism may tend to modify itself by an unconscious act of the will,"—"L'organisme peut tendre à se modifier par un acte inconscient de volonté" (p. 189). We know not what Mr. Darwin would say to an unconscious act of the will modifying organisms, but it is curious and very instructive to see one of his school troubled with these progressive and ascending beneficial varieties, as proving too manifestly a divine prevision, and thereby letting in the Creator, against whom the door had been carefully locked by spontaneous generation.

But by all this we are enabled to understand the real meaning of secondary causes, producing, by divine appointment, all the forms of life; it is only a civil way of getting rid of that which is the great obstacle to the theory; and yet, after all, it is evident that the Transmutationists are obliged to invest matter with divine power, which is, in fact, but a roundabout way of arriving at Pantheism.*

Mr. Darwin, having secured a start for life, prefers a system which dispenses with the necessity of a cause; varieties arise *by accident*; but those of his school who think deeper on these matters, and are more careful of their logic, perceive that this is untenable, and thus

* M. Pouchet obviously finds in Pantheistic notions the solution of the great difficulty:—"Dans presque toutes les cosmogonies on semble indiquer que l'esprit divin est en quelque sorte infiltré dans chaque fragment de la création. *Jovis omnia plena*, disaient les anciens. Cette pénétration indéfinite des parcelles de la divinité dans toutes les molécules de la matière, ce panthéisme, enfin, qui anime d'un souffle divin tous les atomes, né au sein de l'antiquité et ressuscité par la moderne philosophie allemande, ne vient-il pas prêter son appui à l'hétérogénie? (*i.e.* génération spontanée.) Cet esprit immatériel, intimement uni à la matière, ne doit-il pas en régler les mouvements, en présider les transformations et lui imposer des lois? Là, la faire apparaître par la succession harmonieuse de la génération, ailleurs l'animer spontanément." ('Hétérogénie,' p. 124.)

they imagine a creative intelligence in matter—*intelligence créatrice*—matter modifying itself by an unconscious act of the will.*

Lamarck, who taught that matter was constantly producing forms of life by spontaneous generation, could, by this supposition, account for the co-existence of innumerable organic beings, both of the lowest and the most advanced forms; for the advanced organizations had commenced their destiny of transmutations in a remote antiquity from spontaneous generation; but the lower forms were of more modern date, and as nature was always producing new life, it was no wonder that vast multitudes of beings were still in a low grade, having yet to ascend in the scale of progressive organization. Mr. Darwin, however, has no way of surmounting this difficulty but by asking us "how we know it would be of any advantage for the lower forms to be promoted," which is, in fact, making his system nugatory for the mere purpose of answering a hard question. If it be of no advantage for low organisms to be promoted, then that settles the question of these "favourable variations," by which he assures us every low animal *has been* actively advanced. This is one of those numerous contradictions for which his system is remarkable.

Here, again, it will be instructive to hear the Transmutationists rebuking the leader of their school—

"Mr. Darwin supposes that an animal brings with it into the world *by accident* (*par hasard*) some physiological modification or some anatomical disposition, which are individually advantageous for it in the great struggle of life. With this advantage, it will henceforward have a chance amongst the strongest (*les vainqueurs*) to unite itself with another animal which from its birth has been equally endowed with qualities enabling it to come off victorious. They will together leave a numerous posterity, and there is every chance that the descendants of such a couple should inherit the same instinctive disposition or the same conformation; and, at last, by the repeated action of this natural proceeding, a new variety may be formed, and so supplant the parent species, or co-exist with it. Such, in a few words, is the theory of natural selection. In our opinion *it is a false interpretation*

* These sentiments, professed by many millions of the human race, are of an antiquity beyond the reach of investigation. The whole is well condensed in one of Virgil's beautiful lines,—"Mens agitat molem, et magno se corpore miscet." Spontaneous generation, thus interpreted, is matter transforming itself by an inherent divine force.

of facts (*pour nous il y a ici une fausse interprétation des faits*). We do not believe in this accidental native disposition, which can transmit itself so as to become a specified character. We have shown, in speaking of hybridity, that a native *individual* disposition must always disappear, by the simple fact that it is individual; it is of necessity extinguished by crossing in the tenth generation, if, indeed, it be not in the first, in the midst of a population which does not possess this peculiar disposition. We quite admit with Lamarck that species are formed from one another by the appearance of organic modifications, more or less pronounced; but we leave nothing* *to accident* in this phenomenon, as Mr. Darwin does, and we see in it nothing but the application of general laws."†

The Transmutationists, therefore, are not a happy family. There is very little harmony amongst them; in negative information they are unanimous, but in positive instruction all is confusion and discord amongst them. They can agree to deny creation, but when they come to explain their own systems, they contradict and rebuke one another. Mr. Darwin would tell M. Pouchet that his system is based on a principle which modern science does not confirm; and M. Pouchet would return the compliment by saying, that Mr. Darwin's

* The difference between the Transmutationists is precisely in this important point. Mr. Darwin says, in the plainest terms, "I believe in no law of necessary development." His system essentially rests on the theory of *accidental* variations; in this he stands alone. All the other Transmutationists believe in necessary developments as explained by M. Pouchet. This also was the doctrine of Lamarck, and is that of Büchner and of several others. The theory which explains to us the origin of all organized beings by a long series of accidents, is quite without a parallel in the history of intellectual extravagances.

† Pouchet, 'De la Pluralité des Races Humaines,' p. 175. M. Pouchet, in this sketch of the theory of natural selection, has embellished it with circumstances which do not belong to it. Mr. Darwin never supposes that the successful species will co-exist with its parent species in the struggle for life; he constantly affirms that the parent species will be destroyed. This, of course, his theory requires; for if the parent species from which the improved one is derived is not exterminated, where is it? Now, as he never pretends that any existing species is derived *directly* from any existing species, but that the connecting links are wanting, of course the parents must be *always* exterminated. Neither does Mr. Darwin say that a victorious individual finds another victorious individual of the other sex, with which a new progeny may commence. He seems to feel the absurdity of supposing two accidental changes precisely similar, exhibiting themselves at the same time in two creatures, so he leaves that matter in the dark. The new variation is propagated we know not how. M. Pouchet interprets the theory according to his own ideas of what would be reasonable.

system is based on no principle at all. M. Trémaux criticizes Mr. Darwin, and objects to a fundamental position of his theory; and Continental writers of this school, though they praise Mr. Darwin as a learned *confrère*, yet they soon make it clear that they cannot agree with him.

Dr. Louis Büchner, a writer who has produced a great sensation in Germany by his work, 'Force and Matter,' and who scruples not to profess in defying terms broad and vaunting atheism, quotes Mr. Darwin as a most valuable and powerful ally. He seems to have published the first edition of his book before Mr. Darwin's work appeared, for thus does he express himself in the later editions:—"I could not know that the dogmata concerning the non-existence of primeval spontaneous generation, and the immutability of species, which were then considered almost too sacred for attack, would soon experience such severe shocks, and that the celebrated theory of Darwin would reduce the whole organic world, past and present, to one fundamental conception."

Nevertheless, Dr. Büchner contradicts Mr. Darwin in almost all his leading principles, and that so unreservedly, that we must conclude either that he has not read his book, or having read it, holds it in no esteem.

For instance, thus does he explain his own system:—"Our present knowledge is *sufficient* to render it highly probable, perhaps morally certain, that a spontaneous generation exists, and that higher forms have gradually and slowly become developed from previously existing lower forms, always determined by the state of the earth, but without the immediate influence of a higher power" (p. 72).

We know what Mr. Darwin says of the evidence of geology; how he complains of its "extreme" imperfectness, so as to be of no value in proving his theory; but Dr. Büchner says, "The gradual development of the lowest organic forms into higher and more perfect organizations may, in spite of individual exceptions, be considered *a fact established by palæontological investigations*" (p. 72).

Again, Mr. Darwin derives all life from one point; but Dr. Büchner says, "We must not be understood to maintain that the whole organic world originated from a single centre; *all facts and investigations prove, on the contrary,* that it must have arisen from innumerable independent central points, both as regards the vegetable and animal world" (p. 83). This is, therefore, a flat contradiction of

Mr. Darwin's origin of species, and so in many other questions these learned gentlemen learnedly disagree.

Dr. Büchner, nevertheless, comes at last to a checkmate, and precisely in the same position in which Mr. Darwin lost the game:—"Spontaneous generation played no doubt a more important part in the primeval epoch than at present, nor can it be denied that in this way beings of a higher organization were produced than now. *We possess, however, neither certainty nor well-founded data on this point, and are ready to confess our ignorance;* but though as regards organic creation much may be doubtful, we may still positively assert that it may have and has proceeded without interference of external force" (p. 84). This acknowledgment of ignorance and want of information at the very point in which the system requires direct and certain knowledge is precisely Mr. Darwin's case, and is expressed in words very similar. Dr. Büchner, after all, cannot explain the great mystery, even with the aid of spontaneous generation; only of this he is quite certain, that divine power had nothing to do with the production of life and of organized beings.

After all this evidence, we come to the conclusion that in the great question of the Origin of Species,—which is, in fact, the beginning of things,—we have learned nothing at all from the various conjectures and theories of the Transmutationists, and least of all from Mr. Darwin. We have received nothing from the school but a variety of hypotheses and many guesses in the dark, and many contradictions and disagreements of the several teachers. Neither is it possible that anything can be learned on the origin of species. We can only know that which nature shows us, and which we all can understand, that species exist; the commencement of their existence is concealed in impenetrable obscurity. To what power the commencement is owing *we* do not doubt at all, but of the mode and means of commencement we do not pretend to suggest anything. The Transmutationists have undertaken to show the mode and the means, and we see the result; it is a medley of blind men groping in the dark and stumbling over one another. M. Quatrefages, in his great work, 'L'Unité de l'Espèce Humaine,' has well said, "Les vues de M. Darwin s'attachent à l'origine des choses, *et il me paraît difficile que la science positive remonte jusque-là*" (p. 198). They, therefore, that will undertake to scale these inaccessible heights ought not to be surprised if their

descent should be more rapid than agreeable. The fall may be stunning, but if it should induce them to respect the true limits of positive science, they will have gained something by their painful experience.

ON VARIOUS SAMOAN PLANTS AND THEIR VERNACULAR NAMES.

By the Rev. Thomas Powell, F.L.S.

[Before each word the natives use the article *o le;* e. g. *o le mosooi*, *o le sinapi*, etc. The vowels have the Italian power and sound, the consonants the English, with the exception of *g*, which represents the sound of *ng*. The inverted comma between two vowels represents a semi-guttural sound, which in the neighbouring islands has the full sound of *k*; *e. g.* Samoa, *i'a* (fish), pronounced with a harsh impulse of voice, becomes *ika* in Tonga.]

A'a'a, *vel* A'aa'a (*Composita*). An odoriferous herb, used for scenting oil.

A'amau. Cocoa-nuts which, having fallen, spring up without having been planted.

Aano. The kernel of the Cocoa-nut.

A'atasi (*Cardamine sarmentosa*). Called on Niuē "vakataha" and "horofa."

Afa (*Nauclea* sp.?). A large tree. Branches spreading. Wood fine-grained, hard, durable, straw-coloured; useful for plane-stocks, etc. Leaves opposite. Stipules large, leafy. Inflorescence in dense heads of white monopetalous flowers, each head enclosed by a pair of leafy bracts. Fruit a capitulum of numerous 2-celled, many-seeded inferior carpels.

Afía (*Ascarina lanceolata*). Found on the island of Ta'ū only, the most easterly of the Samoan group. Much esteemed by the natives as a perfume, and eagerly sought from Ta'ū by the inhabitants of the other islands. The leaves are dried in the sun, and then mixed with the newly-expressed cocoa-nut oil used for anointing their bodies. With the dried leaves pillows are stuffed.

Afía-váo (the bush Afía). A pretty arboreous shrub. Flowers and fruit chocolate-coloured. Fruit flat.

Ago (Ango) (*Curcuma longa*). Root scraped and converted into turmeric, which the natives use as a cosmetic and as a dye, in which state it is called "Lega" (Lenga).

Aile. The very young fruit of the Cocoa-nut tree (*Cocos nucifera*), often found on the ground in great numbers, about the size of an apple.

Aisali. The perianth of the Cocoa-nut, used as a substitute for a spoon.

Akave (*Agave*, sp.). Introduced.

Ala'a. A large tree. Leaves ovate-lanceolate, small, shining.

Alaalatoa. Same as "Lalatoa," *q. v.*

Aleale. A cocoa-nut in which the kernel is just beginning to form. Applied metaphorically to a coward.

Aloalo (*Premna Tahitensis*). A shrub, arboreous, odoriferous, the upper part of the stem round, spreading, inclined to twine. Leaves exstipulate, entire, opposite, cordate-ovate. Bracts leafy, a stiff, erect bud in each axil. Flowers minute, in axillary corymbs. Calyx monosepalous, slightly lobed, irregular, green. Corolla monopetalous, pale green; tube cup-shaped; lobes 4, irregular. Stamens didynamous, inserted into the corolla, the larger two one on each side of the upper and largest lobe, the smaller two one on each side of the lower and smallest lobe. Ovary superior; style filiform; stigma bifid, the lobes scarcely distinguishable. Fruit round and fleshy. The natives make use of this plant for perfuming their oil.

'Alo'alo. The raceme of red flowers of the "Gatae," *q. v.*

Aloalo-sina. *Vide* "Utouto."

Aloalo-vao *and* Aloalo-tane (*Rubiaceæ*). A tree, with opposite leaves and interpetiolar stipules.

Anaoso (*Guilandina Bonduc*, Ait.).

Anúme (*Maba* sp.?). A tree, not large, diœcious. Male flowers: Calyx monosepalous, 3-lobed. Corolla monopetalous, 3 small lobes alternating with those of the calyx, hypogynous, imbricate in æstivation. Stamens 3, surrounding a conical disk; filaments very short, free. Anthers free, triangular, bursting longitudinally. Fruit drupaceous, 2-celled, 3–4 stony seeds. Eaten by the children. In bloom in June or July and January or February.

Aŏa (*Ficus prolixa*). A kind of Banyan. "Some of these trees were seen whose pendent branches had taken root in the ground to the number

of thousands, forming stems from an inch to two feet in diameter, uniting in the main trunk more than eighty feet above the ground, and supporting a vast system of horizontal branches, spreading like an umbrella over the tops of the other trees." (Wilkes, Narrative of U. S. Expl. Exped., A.D. 1838–42, vol. ii. p. 119.) This testimony is correct. There is a tree of this description near my house, many fathoms in circumference, its roots extending horizontally, level with the ground, many fathoms also. Another of these trees grows about a mile from my house on the right-hand side of a path which leads to the village of Fagasā, a considerable distance from the path towards the mountain. This is remarkable for having grown near a large "Ifi" (*Inocarpus edulis*), its branches embracing and concealing the trunk of the "Ifi," whose crown is seen spreading out above as though they grew out of the "Aŏa."

Aŏa-fafine, Aŏa-tai (*Ficus* sp.). This is a large tree, which does not send down roots from its branches. It has a large straight trunk and spreading branches. Fruit the size of a large currant, dark coloured, and very sweet when ripe. There is a fine specimen of it near the sea-beach on Aunuu.

Aŏa-tai. This zoophyte assumes the appearance of a small tree, with a dark brown stem and branches.

Arasi (*Melia Azedarach*). Brought from Australia, and naturalized in Samoa.

Aságe, *al.* Fue-aságe (Fue, a creeper) (*Morinda* sp.). Stem round, rough, with numerous spreading branches, all twining. Leaves small, opposite, entire; stipules interpetiolar. Flowers small, in heads of 5–10. Calyx apparently inferior, cup-shaped, rising above the ovary, entire. Corolla monopetalous, greenish. Stamens 4 or 5, inserted in the corolla. Ovary inferior; ovules 4?, ascending; style as long as the corolla; stigma bifid. Fruit a capitulum of 5–10 carpels, much resembling that of *Morinda citrifolia*, but much smaller and of darker colour. Stems used for making traps, called "ume," for catching large crayfish. I have met with this plant only on Manu'a, on the ridge of the mountain behind the village of Faleasao.

Asauă (*Gleichenia dichotoma*).

Aságe (*Cinchonacea*). A twining plant.

[Asi. A broad ring of cocoa-nut shell, used for scraping "Taro."]

Asi. The name by which the Sandal-wood (*Santalum*, sp. pl.) is known,

Asi-lauifi. The Ifi-leaved "Asi," or Sandal-wood.

Asitoa, Asi-vai (*Eugenia* sp. ?). Very hard and durable.

Asivao (*Eugenia* sp.). Fruit subacid, purple, elongated, edible. I have met with it only on Manono.

Ateate (*Composita*). This is a very common yellow-flowered species, grows 2–4 feet high, strong smell. Called in America the Stink-plant. [*Calendula officinalis ?*, EDITOR.]

Atiu (*Karivia* sp. ?). A pretty, small, procumbent creeper, with rough, hairy, palmate leaves. Fruit round, yellow, about the size of an apricot.

Atone (*Myristica*, sp. plur.). There are three kinds :—

1. A very tall tree, branches not descending. Fruit as large as a pigeon's egg, nearly round. Mace straw-coloured.

2. Fruit oblong. Mace red.

3. Fruit small, roundish. Mace red.

Both these latter two send down numerous branches, like the "Aŏa" (*Ficus prolixa*); and of them Wilkes says, "Of the Wild Nutmeg two species were seen, which are small trees, and likely to be passed without notice, were it not for the peculiar manner in which branches grow out of the trunk, which is in whorls at regular intervals, like the White Pine (*Pinus Strobus*) of our Northern States." (Wilkes, Narr. U. S. Expl. Exped. vol. ii. p. 120.)

'Au'auli (*Dyospyros Samoensis*, A. Gray). A large tree. Branches spreading. Wood hard, used for axe-handles. Foliage dense, dark green. Leaves alternate, exstipulate, obsoletely articulated with the stem, ovate-lanceolate, entire, coriaceous. Inflorescence axillary; peduncles 1–3, 1-flowered, with minute bracts. Flowers hermaphrodite. Calyx inferior, with 1 or 2 leaf-like caducous bracts at its base and smaller ones on its peduncle, 4-lobed, rotate, coriaceous, persistent, its base adhering to the torus forming a cup surrounding the ovary, imbricate in æstivation. Corolla hypogynous, monopetalous, its base globose, its lobes 4, rotate, somewhat coriaceous; æstivation imbricate. Stamens twice the number of the lobes of the corolla, into whose base they are inserted, the 4 more fully developed ones alternate with its lobes, the other 4 opposite to them; filaments distinct, flat, broad; anthers 2, lobed, innate, divergent, dehiscing longitudinally. Ovary superior, seated on a short torus, 8-celled, with a pendulous ovule in each; styles 4, connate at the base; stigmas 2-cleft. Fruit round,

indehiscent, crowned by the persistent stigma. Seeds 8, or 6 or 7 by abortion, pendulous from their apex; testa membranous, brown; albumen white, transparent. In bloom in December. The secretion of the fruit is a vesicatory, and turns the human skin black. The Samoan boys and girls are accustomed to insert the midrib of the cocoa-nut leaflet into the fruit, and apply the liquid thus obtained to their arm in several places, which produces blisters, and eventually permanent prominences, which they consider an ornament. The fruit is used in Niuē (Savage Island) for poisoning fish; the tree is there called "Kiéto," and its wood used for spear-points.

[Aulosoloso. The spike of cocoa-nut flowers.]

Aute (*Hibiscus Rosa-Sinensis*).

Aute fafine (*Hibiscus Rosa-Sinensis*, fl. pleno).

Aute Tonga (*Hibiscus Storckii*, Seem.).

'Ava (*Piper methysticum*).

'Ava'avaaitu (*Piper insectifugum*). Fruit long, red.

'Avapui (*Zingiber Zerumbet*). Two varieties.

'Avapui-papalagi (*Amomum* sp.). Naturalized.

'Avasā (*Papilionacea*). A small shrub, regarded by the natives as poisonous. Flowers white.

'Avasāuli, Avasā-Tonga, *al.* Laumātui (*Cassia* sp.). A very pretty shrub, with unequally pinnate, dark green leaves. Yellow flowers.

Ega *vel* Niu'afa (*Cocos nucifera*). The long kind, rather rare and highly valued, of whose fibre the 'Afa (Sinnet) is made.

Esi (*Carica Papaya*). Esi tane—the male. Esi fifane—the female.

Fa. The stem of the Taro-leaf, furnishing a nice dish when cooked, and is a good substitute for Asparagus.

Faapala. The name of a tree with gummy fruit.

Fa'i *vel* Mo'ē (*Musa*). Spadices pendent.

Fa'i-puputa. Very large fruit.

Fa'i-papalagi (*Musa Cavendishii*, Paxton). There are many indigenous species of *Musa*, but the foreign *M. Cavendishii* is the most prolific and abundant. It was introduced by the Rev. J. Williams in 1838, from Chatsworth. The species of this genus whose spadices are erect are called by distinct names, *e. g.* "Soa'a," "Sulasula," etc.

Fagu (*Karivia Samoensis?*, A. Gray). The fruit is used by the natives as bottles for their scented oils.

Fala (*Pandanus* sp. plur.).

[Laufala (*Pandanus caricosus*). Of its leaves the fine house and sleeping-mats are made, and the baskets ornamented, slips of it being used with those of the outer black coat of the " Soa'a."]

Falagaua, F. 'aina (*Ananassa sativa* Lindl.). Introduced from Tahiti, naturalized and cultivated.

Falatea (*Ananassa sativa*, var. *prolifera*). A proliferous, purple-coloured species, having many pretty sprouts and flowers growing on the fruit near its apex.

Falagā. A tree, delighting most in the neighbourhood of streams. Branches somewhat spreading. Leaves alternate, ovate-lanceolate, from 12 to 18 inches long. Flowers much resembling those of the Malay Apple, and hanging in long tassels from the branches. Fruit 4-lobed, 1-seeded, indehiscent, similar in texture and structure, but not in shape, to that of *Eugenia neurocalyx*. The distinguishing characteristic of this tree is the axillary strings (peduncles), bearing numerous flowers, and constituting beautiful crimson tassels.

Fanaio. Another name for the " Tiátuli," *q. v.*

Fana'ī o. The name on Manu'a of a large tree, with whorled leaves, monœcious. Fruit a whorl of red follicles, 4 follicles in each calyx.

Fanafanāmánu (*Canna Indica*). Naturalized. [*Fana*, to shoot; *manu*, bird, animal.] Often seen planted, for ornament, near native houses.

Fanuāmămálă (*Euphorbiacea*). A small, graceful-looking tree, 10–12 feet high. Leaves ovate, light green, on long flesh-coloured petioles; stipules caducous. Flowers monœcious, monadelphous. Fruit 2–3-celled, flattish. Stigmas persistent. Leaves applied by the natives to ulcerous sores.

Fasa (*Pandanus* sp.). A species resembling in habit *P. odoratissimus*, but having smaller leaves, and a fruit smaller and less odoriferous than that species.

Fatimătáo. A small tree. Fruit round, clustered in fives around a common disk.

Fau. The collective name for several species of *Hibiscus* and other fibre-yielding plants.

Fau (*Hibiscus tiliaceus* et sp. plur.).

Faualogā. The name on Manu'a of the " Fausogā."

Fau-o-Tagaloa (*Hibiscus Abelmoschus*).

Faupata (*Cypholophus* . . . . . .). A plant, growing from 4 to 8 feet high. Flowers and fruit sessile. Of the fibres of the inner bark the Samoans make their beautiful white shaggy mats called "Ie-sina" and "Si'aloa."

Fausogā, *al.* Sogā (*Pipturus propinquus*, Weddell). A very graceful small tree. Inner bark used for making fishing-twine and lines. Fruit a white crystal-looking capitulum.

Fautu (*Hibiscus tiliaceus*).

Fauui *vel* Faūi (*Tiliacea*). A rather pretty-looking tree. Wood hard, and valuable for various purposes. Flowers yellow, apetalous; sepals leathery, valvate. Stamens ∞. The inner bark used for making fishing-lines.

Fau-uta (*Maoutia australis*, Weddell).

Fena, *al.* Oli (*Eugenia neurocalyx*); varieties:—Fenaui, Fenatoto. A tree, erect, about 12 feet high. Branches spreading, bearing beautiful sessile sweet-scented flowers and fruit (the latter used only as a perfume, often suspended to the neck by a string). Leaves opposite, exstipulate, minutely dotted (dots scarcely discernible by the naked eye); bracts alternate, spine-like, situated just above the axils of the upper leaves. Calyx 8-lobed, 4 inner and 4 outer alternating with each other, all purple-red. Petals 8, in two rows, straw-coloured, yellow, attached to the calyx just above the attachment of the stamens, which also are yellow, long, and very numerous; filaments free; anthers not very small. Ovary 2-celled; ovules numerous and long; placenta central; style awl-shaped, simple; stigma simple. Flowers in clusters on the stem. In bloom in June.

Fetai. A plant, with a string-like, light brown, leafless stem, creeping, twining; apetalous, monœcious. Ovary superior. Fruit subdrupaceous, superior, surrounded by the enlarged persistent calyx. Used by some natives to produce abortion.

Fetau (*Calophyllum inophyllum*). The "Tamanu" of the Tahitians. Flowers, as well as the albumen, odoriferous.

Fiafiātuli. Another name for the "Tamole" (*Portulaca quadrifida*). Called on Rarotonga "Luna."

Filimóto (*Flacourtia* sp.?). A fruit tree, 15–20 feet high. Leaves alternate, ovate-lanceolate, petiolate, serrated, exstipulate. Young leaves very thin and reddish-purple colour. Inflorescence . . . Calyx small, flat, persistent; 4 small, rounded segments, which do not meet.

Corolla none. Stamens and pistils apparently indistinguishable. Ovary superior. Fruit a drupe, about the size and shape of a Greengage plum, red, contains 12–14 hard roundish seeds, about half (?) the size of a cherry-stone, lying in two parallel tiers, attached to a central placenta; the fruit has, adhering to its apex till nearly ripe, 6–8 sharp, horny prickles, apparently the remains of the styles. The flower seems to consist of a small monosepalous calyx, having inserted upon it many stamens, almost sessile, a little tinged with red. The pistil appears to consist of 6–8 carpels, with as many styles. Placenta central.

(*To be continued.*)

CORRESPONDENCE.

Flora Vectensis.

There are probably not very many species to be added to the list of Isle of Wight plants. The labours of the late Dr. Bromfield, until the autumn of the year 1850, and of Mr. A. G. More, up to a very recent date, have rendered this one of the best worked districts in Britain. The latest published list is, I believe, one prepared by Mr. More, as an index to Dr. Bromfield's herbarium, but which also contains very numerous additions and corrections made by him since Dr. Bromfield's death. The following are the only plants not noted in a corrected copy of that list, kindly given to me by Mr. More, which I have seen growing in the island:—

Iberis amara, L. A single plant in Grange Chine. Most probably the seed was brought there by the stream which runs through the Chine from Brixton.

Ulex Gallii, Planch. At Staplers, near Newport; on gravel lying above Osborne and Headon beds. Probably also in other localities.

Trifolium hybridum, L. This plant occurs as a waif of cultivation, but I have also collected it in Parkhurst Forest, apparently naturalized.

Calamintha officinalis, var. *Briggsii*, Syme. On chalk, near Newport.

It may be worth recording that a single plant of *Cephalanthera grandiflora*, Bab., was found in New Barn Hummett, near Calbourne, in June of this year, by Miss Dennett, who very obligingly presented the specimen to me. A single plant was also found by Dr. Bromfield, in the same locality, on June 8th, 1844, since which date it has until now never been seen. The only other locality in which it has ever been known to grow in this island, is a lane near Carisbrooke Castle, but it has not been observed there since 1847 or 1848, and a diligent search has failed to discover any vestige of it.

It may interest some of your readers to know that a plant of Maiden-hair (*Adiantum Capillus-Veneris*, L.) which I placed last summer in a crevice in the wall of my garden here, survived the winter, and has now a very strong and healthy frond.

Newport, Isle of Wight, July 18, 1868. FRED. STRATTON.

NEW PUBLICATIONS.

A New Flora of Northumberland and Durham, with Sketches of its Climate and Physical Geography. By J. G. Baker, F.L.S., and G. R. Tate, M.D. With a Sketch of the Geology, by G. Tate, F.G.S. London and Newcastle, 1868. Pp. 316.

It is thirty-seven years since the publication of Winch's Flora of this part of England, and the want of an account of its vegetation more in accordance with recent views of classification and phyto-geography has been felt for some time. This want is satisfied by the book before us.

The 'New Flora' forms vol. ii. of 'Natural History Transactions of Northumberland and Durham;' it consists of two parts, an introductory portion containing a short account of the geology, climate, and physical geography of the district; and a second part, the flora proper, or systematic catalogue of the species.

In the first chapter Mr. Tate gives a brief but excellent view of the geology of the two most northern counties of England, with special reference to their vegetation; and in a supplement to it, Mr. Baker examines the botanical aspect of the subject in more detail. The latter adopts M. Thurmann's views of the relations existing between the subjacent strata and the flora, and uses his terms. As these are not generally familiar to British botanists, it is to be wished that Mr. Baker had explained more fully and with greater exactness the significations of hygrophilous and xerophilous species, and their connection with eugeogenous and dysgeogenous strata. On p. 40 is given a list of forty-four plants which are xerophilous in Northumberland and Durham; of these, twelve are found in M. Thurmann's general lists of "xérophiles" of central Europe. The list on p. 40 does not seem quite to agree with the body of the work, five plants included in it are not given as xerophilous in the text, and one is mentioned there which does not occur in the list. Mr. Baker also makes a remark which is scarcely borne out by the facts given in the Flora; he says (p. 43), "the species which are restricted to dysgeogenous tracts (in central Europe) . . . with us . . . are restricted lithologically in a

similar manner." But of the nine (not eight) species which the district possesses of M. Thurmann's fifty *typical* "xérophiles," only three appear in the list of forty-four xerophilous plants already mentioned, the remaining six being by no means so restricted (*e.g. Euphorbia amygdaloides, Mercurialis perennis*).

The chapters on the climate and the physical geography will be read with great interest. Northumberland and Durham together correspond to Watson's Tyne province, and contain three of his vice-counties. The province is divided by Mr. Baker into eleven districts, founded on the drainage. It is to be regretted that the distribution of all the species throughout these districts has not been attempted to be shown, but material probably does not exist at present for rendering such a table possible. The boreal species (108 in number) are, however, so treated; and it is singular to remark that the district containing by far the largest number (74) of these is the most southern one. Mr. Baker "cannot undertake to explain" the reason of the richness of Teesdale in mountain species. In this portion each of the drainage-districts is in turn passed in review, and its peculiarities, altitudes, and characteristic species are noticed. This part is very well done, and is a somewhat novel feature in a local Flora.

In the enumeration of species, the nomenclature of the fourth volume of the 'Cybele Britannica' is followed. It appears that 937 out of the 1425 species there given are found in Northumberland and Durham, but only 848 are considered genuine aborigines, 89 being weeds of cultivation, etc. Besides these, there are enumerated 87 stray garden plants and 117 plants of ballast, etc.; in all, the Flora contains 1141 species. But here again are discrepancies, the numbers on pp. 109 and 306 differing.

The comparison with Mr. Watson's "types" gives some interesting results. As the authors express it, "the characteristic of the north of England is, that it yields a fair proportion" of southern and northern species, and, indeed, the prevalence of south-English plants is striking, 26 "Germanic" and 5 "Atlantic" species occur. The province has 80 fewer plants than Yorkshire, "the difference being caused almost altogether by the absence beyond the Tees of southern plants which run out in Yorkshire." 77 species do not extend beyond the province northward into Scotland. The only peculiar plant is *Arenaria uliginosa*. Of Watson's "intermediate" type Northumberland and Durham

want 12. As it might be expected that all of this type would be found there, we give the names of those which are wanting:—*Actæa*, *Hutchinsia*, *Draba muralis*, *Cardamine impatiens*, *Helianthemum canum*, *Polygala uliginosa*, *Vicia Orobus*, *Lysimachia thyrsiflora*, *Crocus nudiflorus*, *Scheuzeria*, *Juncus filiformis*, *Lastrea rigida*. Some of these may be found in the province if searched for.

The treatment of each species is rather meagre. After the name follows the class of citizenship; and here also Mr. Watson's names are adopted; the type of distribution; the area, expressed by the initial letters of the three vice-counties; and the range of altitude. Very few localities are given, and only for the rarer species; and the use of such terms as "common," "frequent," etc., appears somewhat vague and unequal. An interesting feature, however, is found in the notes of the altitudes up to which various species extend.

On the whole, this 'Flora' strikes us as being so much above the average, that it is a subject for regret that a little more trouble was not taken to finish it off more thoroughly. Moreover, the type used and the arrangement of the matter on the page are by no means good. With these drawbacks the book is still a valuable addition to English botany. It is a trustworthy list of species for north England, and accurately shows what are truly native there; besides this it is *readable*, a quality certainly rare in local Floras.

BOTANICAL NEWS.

"The vacancy in the Chair of Botany in the University of Oxford has been filled by the appointment of Mr. M. A. Lawson. So important an office has rarely fallen to the lot of so young a botanist, but we believe there is every prospect that Mr. Lawson will show the wisdom of the appointment, his botanical acquirements being of a high order. The superintendence of the Botanic Garden, and, we presume, also of Mr. Daubeny's Experimental Garden, will devolve on the new Professor."—*Gardeners' Chronicle.*

The first volume of Professor Oliver's 'Flora of Tropical Africa,' containing *Ranunculaceæ* to *Connaraceæ*, has just been published by Messrs. Reeve and Co. The same firm has also just published the eighth part of Dr. Seemann's 'Flora Vitiensis,' and that author's 'Revision of the Natural Order Hederaceæ,' being a reprint, with numerous additions and corrections, of a series of papers published in the 'Journal of Botany,' with illustrations.

W.G Smith, del. W.Fitch Lith

BOLETUS FRAGRANS, *Vitt.*, A NEW BRITISH FUNGUS.

By Worthington G. Smith, F.L.S.

(Plate LXXXIV.)

In the 'Journal of Botany' for February last (page 33) I recorded my discovery of this interesting species of *Boletus* as a British plant; with the present number is given a figure of it, taken by me from the fresh specimens. For the description, and full particulars regarding its place of growth, etc., reference must be made to the number of 'Journal of Botany' before mentioned, where all particulars are given in detail.

I hope to publish an account of the discovery of several other Hymenomycetous Fungi, new to Britain, in an early number of this Journal.

Explanation of Plate LXXXIV., representing *Boletus fragrans*, Vitt. —Fig. 1. The entire plant. 2. Section of pileus. 3. Spores. Fig. 3, *magnified.*

CHENOPODIUM ALBUM, *Auct.*, AND ITS VARIETIES.

By Hewett C. Watson, Esq.

Three principal forms of this plant are distinguished by English botanists who have given exact attention to the *Chenopodia*. The same forms are also recognized by the Continental botanists, either with or without additional subdivisions. Opinions differ as to the three forms being varieties simply, or sufficiently distinct to be accepted as true species. It is proposed here to give in some considerable detail a record of two experiments, made under conditions suitable for yielding facts such as ought to guide our opinions. The simple facts, by themselves, are only a basis for opinionative inference; the soundness of the inferences therefrom is quite a different matter.

The three forms will be treated as simple varieties in this paper. By Linnæus, two of these varieties were described as separate species, under the names of *album* and *viride*. Afterwards, botanists came to regard these two as forms of a single species; retaining the name of *album* to designate the species, that of *viride* to distinguish the subor-

dinate variety. We find them so treated in the latest editions of Babington's 'Manual of British Botany,' and of Hooker and Arnott's 'British Flora.' The third variety, distinctively named by several of the most active botanists of the present time, has been long partially recognized by our provincial collectors, and by some of them has been occasionally mislabelled *ficifolium*,—an error sufficient in itself to indicate that this third variety differs from those to which our provincial observers usually apply the names *album* and *viride*. Possibly Mr. Bentham may have been misled by such mislabelled specimens; for it is difficult otherwise to account for his union of *Chenopodium ficifolium* with *C. album*.

In the third edition of 'English Botany,' Mr. Boswell-Syme distinguishes the three varieties under the names of *candicans*, *viride*, *paganum*; and these three names it will be convenient to adopt here. In the sixth edition of the 'London Catalogue of British Plants,' which was prepared for press before the appearance of those names in English Botany, the same varieties stand as *candicans*, *viride*, *virens*, some uncertainty being then still felt, whether the last was truly synonymous with the *paganum* of Continental botanists; very likely it is so, and the two names *virens* and *paganum*, of English Botany and London Catalogue, may be regarded as literally synonymous.

Thus, we now recognize one combinate or aggregate species, to which the Linnean name of *C. album* is made applicable, by enlarging its original application, so as to cover or include *C. viride* also. And we subdivide this aggregate *album* into three segregates, *candicans*, *viride*, *paganum*. The selection and application of the names is unfortunate, and it may be a fruitful source of error for some time to come. An adoption of the name *album*, to include white and green states of the aggregate species, has likely influenced our ideas so far as to make us treat *candicans* as the type of the natural species, and to regard the other two as varieties; but, looking to the plants themselves, as seen so abundantly in our fields and ways, *candicans* seems to be a state of *paganum*, more or less contracted in growth and depauperized by sterility of soil, or by any other condition which checks its full development; *paganum* being truly the type-form of the species. We shall presently see the bearing of this remark on the alleged results of experiments, which have been made with a view of testing the constancy of the varieties. Meantime, the two experiments above alluded to should be first recorded.

Experiment First.—Seeds were taken from a single plant of *candicans*; one clearly and undeniably such, as Mr. Boswell-Syme concurred with me in regarding it to be, when picked among a number of other similar plants, growing in a field of very compact clayey ground, and which (I suppose, on good grounds) had been dry and hard when the plants were in the young stages of their growth. The seeds from this one plant were sown in the spring of the succeeding year, 1868, in a drill about two yards long and two inches wide; thus forming a stripe along the middle of a raised bed, originally made for mushrooms in the open air the preceding autumn, but failing to produce them, likely through being made too late in an ungenial season. The bed itself was a heap of horse-droppings, covered over with a layer of very loose earth, consisting chiefly of rotted grass-turves. The seed was sown in a narrow line or drill, in order that the chance occurrence of any other seeds of a *Chenopodium*, in the earth used, might become apparent on the wide sloping space left on each side of the drill along the middle or crest of the bed. Three plants of *C. urbicum* came on the space so left, their presence easily accounted for; none of *C. album* in any of its forms.

Along the drill seedling plants of *C. album* came up abundantly, and were left to struggle against each other for space whereon to grow. The summer of 1868 was hot and dry; and water was given three or four times about midsummer, when the lower leaves of the plants became yellow and flaccid from dryness of air and ground; otherwise, the plants were left to season and chance. About two hundred of them survived to the flowering stage; the most vigorous of these being three to four or even five feet high and copiously branched; the smaller about one or two feet high, mostly unbranched, drawn up weakly under their taller and stronger brethren. If I had seen only the larger examples, without knowing their parentage, I should myself assuredly have labelled them *paganum*, as being in my own estimation certainly nearest to that variety, notwithstanding some slight mealy-whiteness on most of them, attributable perhaps to the dryness of the season. But some of the smaller examples, if equally seen apart, might have been as truly labelled *candicans*; although even these were less mealy-white and less compact in inflorescence, than their parents and its associates had been.

From this sowing a score of specimens have been dried for distribution through the Exchange Club, in order to spread illustrations of

the record here made. To dry full lengths of much-branched plants, four or five feet tall, was inconvenient to impossibility. Instead, the flowering tops of the plants were taken, along with an equal number of the flowering-branches, from the stem some joints below the tops. When dried, a top and a branch were sent to Mr. Boswell-Syme through post, with a request that he would give me his name for these before having an explanation of my own reason for asking it; but if keeping in recollection that he had been asked to look at and name an example of *candicans*, with an intimation that the seeds from it would be sown,—there might be some half-unconscious bias of his judgment in looking at the two specimens sent. His reply to the question came in terms of doubt or hesitancy, but to the effect that one of the two specimens might be *candicans*, approximating to *viride*; the other being also *candicans*, approaching rather to *paganum*. His letter was accidentally destroyed or mislaid, and thus I can now give only the spirit of it, the impression left on my own mind, and not the exact words. The same course was again taken, by requesting Mr. J. G. Baker to give me his names for two other specimens from the same lot. Mr. Baker's reply was more decided, giving the name *paganum* without dubiety; as I had fully expected that he would do and must do.

Experiment Second.—This was a simultaneous repetition of the former experiment, with the slight differences here noted. The seeds were taken from another plant of *candicans* from another locality; the plant shown to Mr. Boswell-Syme in a dried state, and admitted by him to be a fair example of *candicans*. Over a second heap of horse-droppings, a layer of rather stiff mould had been laid, instead of the loose light earth. This bed had been made somewhat wider and flatter, and a trench had been dug round it for drainage; a troublesome mole frequented the bed while the plants were growing, still further increasing the dryness by its burrowing excavations. The plants on this second bed were less tall, and rather more mealy-white than were those in the looser mould of the less dried bed; being, in other respects so like the latter, that I deemed it not worth while to take a quantity of them for preservation as specimens. On both beds the plants were cut down close to the ground, after taking the specimens for drying, in order to avoid the mischief of sowing seeds by thousands on my vegetable ground. A very few later seedlings came

up along the place of the drill on this second bed, and when some of these came into flower in August, as short and branching plants, with loose subcymose inflorescence, the name *viride* seemed more appropriate for them than either *candicans* or *paganum*.

Now, what is to be learned from these two experiments? Clearly that seeds taken from one of the varieties will produce one or both of the other varieties, if sown under conditions of soil which are usually associated with them; or, at any rate, will produce subforms so intermediate in character, that differences of opinion can arise among trained botanists as to which name ought to be given to them. This latter result is precisely in accordance with the facts which any experienced botanist may find by thousands any year in fields and other disturbed ground, by waysides and on rubbish heaps. Let any such botanist first select his own type-forms to represent *candicans*, *viride*, *paganum* respectively. Having done this, let him look around and he will readily find all sorts of intermediate and connecting links between them; many of them so blending the characters assumed in books to be distinctive between the varieties, as to induce constant doubts how they ought to be labelled. Lightly indeed must I esteem the accuracy and judgment of any botanist, who should declare that he had done this, and had still found the typical forms only, without intermediate links.

These ideas are not in accordance with the views avowed in print by some other and well-known botanists; neither do the results from my own experiments accord with the alleged results from their experiments. The contradictions are not inexplicable. This it is incumbent on me to show, in order to support the soundness of my own views, and the accuracy of my own asserted results. To this end I will first request the reader's attention to a passage from 'English Botany,' edition third, in reference to the three varieties; their several names being here used for clearness, instead of the Greek letters substituted in the passage as originally printed:—

"I believe variety *candicans* may prove a subspecies, distinct from varieties *viride* and *paganum*, which pass gradually into each other, but as I have not had an opportunity of testing its constancy by cultivation, I defer to the authority of the majority of botanists by arranging it as a variety. The variety *paganum* is the only one I have raised from seed, and it invariably comes up true. Professor Boreau says

that *C. album*, *paganum*, and *viride* all invariably reproduce themselves from seed." (Eng. Bot. edit. 3, n. 54.)

The able editor of 'English Botany' must have cast aside his usual clearness of judgment when that paragraph was penned and printed. We here find him first mentally separating *candicans* as a subspecies, although he has had no opportunity of testing its constancy. He then forthwith informs us that the other two, *viride* and *paganum*, do pass gradually into each other, although they "invariably" come up true from seed; the latter, *fide* Boswell-Syme himself; both of them, *fide* Boreau. These statements and inferences cannot be praised on the ground of logical consistency or clearness of argument. To warrant the statement that *viride* and *paganum* pass gradually into each other, on his own authority, Mr. Syme must actually have observed intermediate forms, as so many links of connection or step-by-step transition between them. Whence do these intermediate and graduated forms of annual plants come? The answer is obvious—from seeds. This is variability, not *in*variability.

It was easy enough to pen the word "invariably" twice over in the passage quoted; but what justified its use? How many experiments are needed, each set of them made under different conditions of soil, of site, of humidity, and so forth, before we can become warranted in writing "invariably"? A single well-devised experiment may suffice to show variability; supported as that view is by thousands of natural facts in evidence of it around us. A hundred experiments, *made under non-explained circumstances*, would be poor support of *in*variability, inconsistent as that view is with the facts to be found in abundance by any botanist who will look for them in a truth-seeking spirit.

When the experiments are made by nature, then the varieties are so inconstant that intermediate gradations are produced, the varieties "pass gradually into each other," as Mr. Syme himself informs us; but when the experiments are under control of Mr. Syme or Professor Boreau, then no intermediates, no transition links, no varieties are produced; each of the three forms produces its own exact likeness only. Clearly, the experimenters are unequal to their work; they are unable to imitate nature; they are unable to produce in their gardens such variations as unaided nature every year produces in our fields and waysides. How is this? Mr. Boswell Syme limits his own testimony to *paganum*. Now, it has been before remarked that *paganum*, not *can-*

dicans, is the typical form or proper type of the species. When seeds are taken from that typical form and are sown in the kind of ground (say, worked garden ground) which ordinarily produces that form, what could reasonably be expected other than the reproduction of the same type-form ? Such a test would be a sham and an absurdity. If it be sought to test the persistence of a typical form, let its seeds be sown under unusual conditions of soil, or situation, or humidity, etc. If it be wished to reduce back varieties aberrant from the type-form, let their seeds be sown in those soils or situations where the type occurs exclusively, or at least much prevails over the other forms. I am satisfied that no true observer and sound reasoner who acts thus, will afterwards declare that the varieties of *Chenopodium album* " invariably " come true ; that is, constantly reproduce through seeds their own like only without variation.

One other quotation appears suitable and requisite here, if made only in self-defence before readers of the 'Journal of Botany.' Last year I sent to the Botanical Exchange Club a large supply of specimens of *C. album*, expressly to illustrate the fact that intermediate gradations are found wild. In the report of the Club, the following passage occurs :—"Mr. W. sends what he thinks 'intermediate links' between the varieties, but whether they be so in any true sense is to be doubted. As far as experiments have yet gone, they tend to show that these forms come up true from seed." ('Journal of Botany,' No. 63, p. 68.)

Here we have a feeble confusion of thought,—an incapacity to see truth because it is opposed to some preconceived idea, taken up second-hand, which ought never to have defaced a report on facts. The specimens had been brought before the signers of the report in their *visible reality*. They do not venture to assert that the specimens were exact examples of the named varieties, and not forms intermediate in character between those varieties. They substitute verbiage about the possibility of doubting them in the " true sense " of " intermediate links." And then they try to disprove *positive facts*, visible to the eyes and understanding, by allusion to alleged results *purely negative*. Mr. J. G. Baker should be mindful not again to let a report, which he has to sign, be written by a critic so little prepared to criticize correctly. Assuredly that passage was not written by Mr. Baker himself.

SERTULUM CHINENSE ALTERUM; A SECOND DECADE OF NEW CHINESE PLANTS.

By H. F. Hance, Ph.D., etc.

1. *Capparis (Eucapparis, pedicellares) hastigera*, n. sp.; diffusa, ramis angulatis viridibus tomento albo et cinnamomeo stellato detergibili obtectis, spinis stipularibus brevibus subuncinatis, foliis brevipetiolatis e basi cuneata trilobis lobis lateralibus patentibus abbreviatis rotundatis obtusissimis medio producto lanceolato-lineari æquali calloso-mucronato penninerviis novellis tenerrimis maturis coriaceis utrinque eximie prominulo-reticulatis, floribus axillaribus solitariis pedunculis petiolo 6-plo longioribus cum sepalis rotundatis cinnamomeo-tomentosis, petalis oblongis glabris, staminibus circ. 30, ovario linea breviore ovoideo glaberrimo gynophoro longissimo basi lanato suffulto, stylo subnullo.—In herbidis demissis ad Pak-shá, ora maxime australi prov. Cantoniensis, sine fl. et fr. legi, d. 19 Novembris, 1866; ex insula Hai-nan specimina florida nuper retulit cl. Swinhoe. (Exsicc. n. 13732.)

Leaves borne on a petiole 1½–2 lines in length, 2 inches long, the lateral lobes only 6 to 8 lines long, diverging, and therefore presenting a truncate surface above, at right angles with the costa.

2. *Capparis (Eucapparis, pedicellares) Swinhoii*, n. sp.; fruticosa, ramis angulatis tomento stellato albo vel in juvenilibus cinnamomeo obtectis, spinis stipularibus brevibus subuncinatis, foliis petiolo 2–3-lineali suffultis e basi obtusiuscule cuneata lanceolatis apice acutiusculo spinuloso-mucronatis novellis tenerrimis tomento stellato alphitoideo tectis maturis coriaceis glaberrimis penninerviis utrinque fortiter reticulatis, floribus axillaribus solitariis, pedunculis petiolo triplo longioribus cum sepalis ovato-oblongis cinnamomeo-tomentosis, petalis stellato-tomentosis ovato-lanceolatis venosis, ovario sublineali ovoideo glaberrimo gynophoro longissimo basi lanato suffulto, stylo subnullo.—In interioribus ins. Hai-nan, maris Chinensis, m. Martio 1868, collegit cl. Swinhoe. (Exsicc. n. 14409.)

Closely allied to the preceding, and with it, no doubt, near to *C. brevispina*, De Cand., etc.; but the flowers are about four times smaller, and the ovary smooth, quite different in shape, and smaller, besides the other characters given.

3. *Viola (Nomimium) excisa*, n. sp.; acaulis, longe repens, estolo-

nosa?, glaberrima; foliis longius petiolatis serratis serraturis distantibus incurvis glanduliferis late cordato-sagittatis v. cordato-hastatis sinu nempe basilari latissimo semicirculari quasi excavato lobis lateralibus longe deorsum productis rotundatis vel acutiusculis medio æquilongis, stipulis magnis liberis lineari-lanceolatis subfalcatis acuminatis remote denticulatis, floribus longe pedunculatis, pedunculis supra medium bibracteolatis folio plus minus longioribus, sepalis lanceolatis acuminatis appendicibus brevibus obtusis, petalis calyce duplo longioribus oblongis obtusis dilute violaceis venis saturatioribus pictis lateralibus velutinis calcare obtusissimo sepalis duplo breviore, stylo deorsum attenuato stigmate uncinato papilloso, capsula ovoidea, seminibus maturis plumbeis.—Diffusa, longe serpens inter gramina in rivulo exiguo intra sepimenta magni templi Pak-wan-tung, ad Sai-chü-shan, prov. Cantoniensis, m. Aprili 1866, leg. T. Sampson. (Exsicc. n. 13053.)

Appears nearest to *V. Wightiana*, Wall.

4. *Rosa (Nobiles) Amoyensis*, n. sp.; ramulis striatulis purpurascentibus glabris opacis, aculeis sparsis recurvis basi complanatis pallide rubro-purpureis lucidis, foliolis 5–7 increscentibus ovatis ellipticis vel ovato-lanceolatis ipso apice obtusis imcumbenti-serratis subtus pallidioribus utrinque glaberrimis et lucidis necnon conspicue etsi subtiliter prominulo-reticulato-venulosis petiolis parce aculeolatis, stipulis acuminatissimo-setaceis ciliatis ac parce glandulosis denticulatis a petiolo prorsus liberis, corymbis setaceo-bracteatis, floribus parvis, pedicellis angulatis $\frac{1}{2}$–$\frac{3}{4}$ poll. longis cum tubo calycino campanulato $1\frac{1}{2}$–2 lin. longo glaberrimis, calycis laciniis oblongis acutissimis extus puberulis vix glandulosis intus dense albo-tomentosis parce setaceo-pinnatifidis basinque versus aculeolis 1–2 præditis ipsius tubo sesquilongioribus petalis albis oblongis emarginatis sesquibrevioribus, stylis lanosissimis basi tantum in columnam brevem glaberrimam coalitis staminibus duplo brevioribus, cynarrhodis globosis erectis laciniis calycinis arcte reflexis coronatis pisi magnitudine, ovariis sessilibus.—In collinis demissis circa urbem Amoy, satis vulgaris: ipse legi m. Octobri 1857, postea specimina a cll. De Grijs et Sampson collecta pluries accepi. (Exsicc. n. 5690.)

Mr. J. G. Baker, whose critical knowledge of the genus *Rosa* is, I believe, unequalled by that of any British botanist, has examined my plant, and remarks, in a note, "Leaves of *R. sempervirens*, but

calyx, etc., not so glandular, and column of styles less exserted." It differs also, as will be seen by the above character, drawn up from very good materials in my herbarium, in the very small flowers,—no larger than those of the common South Chinese *R. Brunonis*,—and especially in the entirely free setaceous stipules, an important character in this genus, and by which it is, I believe, distinguished from all its European congeners.

I may take this opportunity of stating that I believe there is no ground for regarding *R. multiflora*, Thunb., as a native of Hongkong. I have never found or seen South Chinese specimens myself; and Mr. Bentham, who included it in the 'Flora Hongkongensis,' has since informed me that he almost doubts Mr. Hinds's specimen belonging to this species, and that my own name was quoted on the authority of Dr. Seemann's determination in the 'Botany of the Herald's Voyage.' I have now before me an original specimen of the plant left with Dr. Seemann for that work, but it is unfortunately only in fruit; and, being labelled "Hongkong" simply, and collected about twenty years ago, I cannot give any account of its exact origin. It is, however, indubitably altogether different from Thunberg's species, of which I possess a fine wild Japanese specimen, gathered by Maximowicz, and, from the small lanceolate leaflets pubescent beneath, pea-like fruit, and deciduous stipules, I am inclined to suspect it may be referable to *R. microcarpa*, Lindl.; but, in the absence of flowers, it is impossible to feel any great certainty as to its affinity.

5. *Hedyotis (Oldenlandia) Thwaitesiana*, n. sp.; caulibus basi lignosis longis diffusis decumbentibus gracilibus tetragonis glaberrimis, foliis brevipetiolatis ovatis v. ovato-lanceolatis acutis glaberrimis margine scabriusculis sursum sensim decrescentibus, stipulis brevibus connatis scabridis dentibus subulatis subpectinatis glaberrimis marginatis, cymis axillaribus amplis effuse paniculatis foliis duplo vel pluries longioribus, bracteis foliis homomorphis sed minoribus, corolla infundibulari extus pubera laciniis calycis glabri triangulatis duplo longiore, genitalibus exsertis, stigmate clavato bifido, capsula semiglobosa compressiuscula laciniis calycinis sinu truncato discretis coronata, seminibus in quovis loculo 7–8 minutissimis cochlidimorphis vel fungiformibus nigris scrobiculato-rugosis.—In graminosis prope semitas ad extremitatem orientalem faucium Shiu-hing, fl. West River, prov. Cantoniensis, d. 7 Febr. 1867, collegit T. Sampson. (Exsicc. n. 13755.)

My excellent and learned friend Dr. Thwaites, to whom I have dedicated this plant, and who has made a special study of the Indian species of the genus, informs me that he considers it nearest to *H. monosperma*, W. and A., but that he has seen nothing like it. It has some general resemblance to that plant, but the copious loose axillary biparous cymes which constitute the inflorescence, and the several-seeded capsule-cells will alone readily distinguish it.

6. *Parechites adnascens*, n. sp.; frutescens, caulibus purpurascentibus striatulis pubentibus senioribus demum glabris uno latere radices adventitias breves emittentibus, ramulis petiolisque dense ferrugineo-tomentosis, foliis petiolo circ. lineali suffultis coriaceis oblongo-ellipticis utrinque obtusis supra glaberrimis subtus tomento pallide ferrugineo vestitis adultis magis glabratis penninerviis ½–1½-pollicaribus, cymis dichotomis laxis ramulos terminantibus, inflorescentia tomentosa, bracteis lanceolatis pilosis deciduis, calycis laciniis ecarinatis oblongis plerumque inæqualibus extus pilosis intus glaberrimis acutiusculis anthesi peracta accrescentibus basi intus glandulis quinque subquadratis undulatis auctis, corollæ hypocraterimorphæ tubo calycem duplo excedente infra medium ampliato limbi circ. 8-linealis laciniis obliquis subdolabriformi-oblongis truncatis fauce pilosis, antheris subsagittatis apice connectivi hyalini apiculatis, stigmate conico acuto basi anguste annulato stylo triplo breviore ad medium antherarum attingente eisque adhærente cum corolla deciduo styli apicem ampliatum truncatum relinquente.—In ins. Tai-tan, prope Amoy, rupibus lichenosis, instar *Hederæ* v. *Psychotriæ serpentis*, ope radicum adventitiarum adhærentem, m. Maio 1866 invenit T. Sampson; e prov. Fokien, absque pleniori loci natalis adnotatione, olim misit am. De Grijs. (Exsicc. n. 11071.)

Although Mr. Bentham has, in the 'Flora Hongkongensis,' adopted A. De Candolle's name *Rhynchospermum* for this genus, it is clear that of Miquel must be preferred, as the elder De Candolle himself recognized Reinwardt's *Rhynchospermum*, published eighteen years before that of his son.

7. *Parechites Bowringii*, n. sp.; ramis rubro-purpureis junioribus pilosulis, foliis petiolo 4–6-lineali marginibus elevatis pilosulis suffultis papyraceis oblongis utrinque obtusis spinuloso-apiculatis glaberrimis supra lucidis subtus opacis rete venularum coloratarum eximie æqualiter pictis venis venulisque vero nequaquam elevatis 1½–2-pollicaribus,

floribus in racemos axillares paucifloros foliis dimidio breviores dispositis, bracteis crebris parvis subscariosis obtusis, calycis laciniis brevibus ovatis obtusis margine membranaceis intus squamis 5 membranaceis ovatis iis alternis auctis, corollæ tubo calyce 3-4-plo longiore æquali haud constricto apice subito ampliato limbi laciniis oblique ovatis obtusiusculis, staminibus basi corollæ insertis filamentis rectis corollæ tubo per totam longitudinem adnatis antheris sagittatis exsertis stigmati adhærentibus, stigmate incrassato apice bidentato stylo triplo breviore, folliculis lævibus linearibus valde divergentibus pollicaribus, seminibus apice leniter attenuatis coma sessili ipsis triplo longiore coronatis.—In ins. Hongkong. (Exsicc. n. 6006.)

This plant was given me more than ten years ago by Mr. J. C. Bowring, who had formerly gathered it in Hongkong in company with the late Col. Champion. There is no allusion to it in the 'Flora Hongkongensis.' Though a good and complete specimen it has, like all Mr. Bowring's plants, been subjected to far too great pressure, so that it is only after the most careful maceration and boiling that I have succeeded in separating without injury the anthers from the stigma, and obtained a tolerably satisfactory view of the latter. I thought at first that this might be the *Parsonsia? Helicandra* of Hooker and Arnott; but, when the corolla is split open, the filaments are seen to be soldered with the tube, and to run up quite straight into the anthers. I suppose it is a true *Parechites*, though it does not dry of that peculiar pallid tint found in *P. Thunbergii* and many *Asclepiadaceæ* and *Celastraceæ;* but the genera allied to *Echites* which have been founded by J. Mueller, Wight, and Miquel, having all been established from a comparison of the species of limited geographical areas, without a comprehensive study of all those known, will need a complete revision. As in *Asteraceæ* and *Orchidaceæ*, there can be no doubt that the genera of *Apocynaceæ* and *Asclepiadaceæ* have been multiplied without reason; slight variations in the form of organs, and the presence, absence, or various modifications of appendages of no structural importance whatever being the only grounds of distinction.

8. *Ebermaiera concinnula*, n. sp.; caule subnullo vel hypogæo, foliis rosulatis petiolo brevi v. longiusculo flocculoso suffultis basi cuneatis oblongis obtusis margine sinuatis supra aspero-punctatis opacis subtus pallidis venisque paululum prominulis flocculosis 1–2 pollices longis 4–7 lineas latis, racemis terminalibus 3-pollicaribus pu-

bentibus simplicibus vel basin versus ramos 1–2 nunc proferentibus, pedicellis alternis filiformibus bilinealibus basi bracteatis, bracteis bracteolisque calycis basi approximatis anguste linearibus, calyce pedicello duplo longiore pubescente laciniis subulatis inæquilongis, corollæ glabræ infundibularis subrectæ tubo lacinias calycinas laterales apice pallide apiculatas adæquante lobis obtusis calyce duplo longioribus, stigmate bilobo, capsula oblonga compressa obtusa glabra valvis medio sulcatis. —In rupibus muscosis ad marginem viæ ad cavernam Tsui-ngám ducentis, Sai-chü-shan, prov. Cantoniensis, m. Aprili 1866, collegit T. Sampson. (Exsicc. n. 13021.)

I am indebted to Mr. J. G. Baker, of the Kew herbarium, (who adds that it has been sent from Formosa by Mr. Swinhoe,) for the information that this species is nearest to the Philippine *E. debilis*, T. And. (=*Erythracanthus elongatus*, var. *β*. Nees).

9. *Vandellia (Titmannia) urticifolia*, n. sp.; albo-pilosa, erecta vel basi decumbens 5 pollices ad pedem longa, foliis deltoideo-ovatis acutis a medio ad apicem grosse dentato-serratis 5–8 lineas longis in petiolum alatum lamina tertio breviorem cuneatis floralibus conformibus sensim minoribus, racemis axillaribus et terminalibus, pedicellis calyce paulo v. duplo longioribus, calycis bilinealis laciniis linearibus, corolla calycem parum superante, filamentorum anticorum appendicula obtusissima glandulosa, antherarum loculis divergentibus, capsula oblonga calyci æquilonga.—Ad semitas in angiportu Tsing-yune, secus fl. North River, prov. Cantoniensis, d. 19 Sept. 1866, collegerunt Sampson et Hance. (Exsicc. n. 13769.)

Evidently, as suggested to me by Dr. Thwaites, very near *V. elata*, Benth. It is not unlike *Lindenbergia urticifolia*, Lehm., in the conspicuous shining pubescence and in its leaves, but the latter are much more deltoid.

10. *Chavica leptostachya*, n. sp.; fruticosa, tota glaberrima, ramis angulatis striatis, foliis brevipetiolatis e basi cuneata vix inæquali lanceolatis obtuse acuminatis septuplinerviis nervis marginalibus inconspicuis membranaceis sub lente obscure pellucido-punctatis, amentis masculis cylindricis gracilibus, pedunculis petiolis circiter æquilongis, fœmineis masculis sesquicrassioribus subpollicaribus.—In prov. Cantoniensi ad Sai-chü-shan, rupibus perpendicularibus *Hederæ* instar radicellis adnatam, easque dense obtegentem, m. Aprili 1866, legit Sampson. (Exsicc. n. 13030.)—Folia $2\frac{1}{2}$–4 poll. longa, 8–16 lin.

lata, incluso petiolo 3–5-lineali. Amenta mascula $2\frac{1}{2}$–$3\frac{1}{2}$-pollicaria, in sicco quoad folia patulo-erecta, sed in planta vigente e ramulis graciliter sed rigide dependentia.

This species does not seem to agree with any of those described by Miquel. I suspect it is nearest his *C. sphærostachya*, from which it seems only to be discriminated by the much longer ♂ amenta and the cylindrical ♀ ones.

ON THE DISCOVERY OF *POTENTILLA NORVEGICA*, *Linn.*, IN ENGLAND.

By G. S. Gibson, Esq., F.L.S.

On the 1st of July, 1868, I went, in company with some entomological friends, to Wicken Fen, which is well known as a locality for *Papilio Machaon*, and which still abounds there. In walking across Burwell Fen, my attention was attracted to a plant which grew on the side of one of the marsh ditches, and appeared different from any species with which I was acquainted. Being in haste, I did not stay to search further; but, on examining the specimens after my return home, they appeared to me to agree with the description of *Potentilla Norvegica.* Subsequent comparison of them with those in the herbaria of Linnæus and Sir J. E. Smith confirmed me in the opinion that they belonged to that species, which was fully decided by seeing characteristic specimens of that plant in the Herbarium at Kew. I have since again visited the spot, and, after careful search, discovered about twenty plants growing in the turf of the Fen-drove, or on the sides of the ditch; it did not extend far, but was scattered around some 30 to 50 feet. I did not notice it elsewhere in the Fen, but this is so extensive that it would be impossible to search it over in any moderate length of time. The plant is inconspicuous, and likely to be passed over, except when in flower. Its geographical distribution renders it unlikely to be found native in the southern parts of England; but I cannot account for its introduction in so rough a spot, and it is not a plant that I have ever seen in cultivation. It appears quite at home, and at any rate must have been there for years.

The following is a description of the plant:—

Potentilla Norvegica, Linn. Sp. 715. Stem erect, upper portion di-

chotomous. Leaves all ternate, petiolate, those near the root with long stalks; leaflets oblong, acutely serrated, beset with spreading pili. Petals obovate, shorter than the calyx. Flowers numerous, small, yellow. Height 4 to 8 inches. It is described as annual or biennial, but has more the appearance of a perennial plant. It is found in various parts of Northern Europe, also in Siberia and North America.

ON THE *TANGHINIA VENENIFLUA*, THE ORDEAL POISON-NUT OF MADAGASCAR.

By George Bennett, M.D., F.L.S.

This elegant tree is now naturalized in New South Wales, and is readily propagated. There is a noble specimen of it in the Sydney Botanical Gardens, which attracts attention from its bright green foliage, delicate and fragrant blossoms, and pendulous egg-shaped fruit. The label, close to the tree, inscribed "Madagascar Ordeal Poison-tree," occasions it to be treated with some respect by visitors to the gardens, for while other flowering trees and shrubs suffer from their depredations, it has been remarked that this is the best preserved tree in the collection, as none of its fragrant flowers have been plucked, and the fruit, whether strewing the ground or hanging from the tree in tempting clusters, has never been purloined. It is of the Natural Order *Apocynaceæ*, and derives its generic name from its native appellation in Madagascar, Tanghin. The largest and finest tree in the Sydney Botanic Gardens is twenty feet in height, with a circumference of the branches full fifty feet. It flowers in the months of November and December, and is often observed at the same time covered with fruit in different stages of maturity, produced from the blossoms of the preceding year. The flower-buds are of a beautiful crimson colour, and, when expanded, the corolla is white, with the edges and under surface tinged with crimson; the flowers are very fragrant and their odour is retained for some time after they are withered. The fruit is oviform and about the size of a hen's egg; it contains a hard stone or nut, enveloped in a dense fibrous substance. On this fibrous part being removed, there is seen a dark brown shell, which, on being opened, is found to contain a white kernel, in size and appearance like an almond, and of a slightly bitter flavour. The tree

bears a large quantity of fruit. The fruit is at first (when grown to its full size) of a green colour, then changes to a purplish-red tinge on one side, but, when fully ripe, becomes wrinkled, and the entire fruit assumes a deep purplish-red colour. The whole of the tree yields a quantity of milky juice, very adhesive (which probably arises from containing caoutchouc) and of a sweet creamy taste.

Respecting the toxicological properties of this tree, it is mentioned in a paper published by Professor Pelikan in 1860, that its most poisonous part is the fruit; he had an alcoholic extract prepared from the leaves and stalks of the plant, and, aided by Professor Kölliker, experimented with it on frogs. The experiments proved that it does not belong to tetanic poisons. Its effect is particularly directed upon the heart, the action of which it paralyses, leaving the ventricles in a bloodless condition. This effect is a direct one, and not brought about merely by the medulla oblongata and the spinal marrow. Secondarily, it paralyses the motor nerves in the direction from the centre towards the periphery; tertiarily, it paralyses the muscles of voluntary motion. The *Tanghinia* is thus to be considered a specific poison for the heart and muscles; it paralyses the muscles less rapidly than upas, veratrine, and sulphocyanide of potassium, but in regard to its paralysing action upon the heart, surpasses considerably the two other poisons, veratrine and sulphocyanide of potassium.

"Like the savages of Madagascar, our ancestors were great believers in witchcraft; that old superstition of the darker ages which led our pious forefathers to burn or drown harmless old women, and count it a righteous deed so to do," but abolished by them as education progressed. It now remains among the savages of Madagascar, who, for this and other crimes, use the Ordeal-nut, and it is regarded by them as an infallible detector of guilt. The portion used in the Ordeal is the kernel of the fruit, which is pounded before being administered to the accused person; should it cause vomiting, the accused person escapes, but to those by whom it is retained, it proves rapidly fatal and thereby their guilt is considered to be established. The operation of the poison in the Ordeal differs, sometimes acting as a virulent poison, generally as an emetic. In one published account it is stated that "a difference visible even to the naked eye does exist between that which only occasions vomiting and that which destroys; the latter always presenting a slight appearance of redness.

The people declare that this hue is miraculously assumed, and regard the change as an infallible sign of death to the accused; yet, if this redness be exceedingly obvious, the relations who are present, desire that such a fruit may be rejected and another chosen; this proposal is probably agreed to, but the next fruit exhibits the same ominous presage and the victim dies. Several opinions are held by the natives on this subject: some say that there are *two kinds of trees*, one *poisonous, the other only emetic*, and so similar in appearance that none but the administrators know the difference, and even they sometimes err, destroying when they intend to save, and *vice versâ*. May not this be explained by two species existing in Madagascar? The *Tanghinia Manghas*, a species found in India, bears a fruit which is stated to be emetic. This species was supposed by some botanists to be identical with *T. veneniflua*, but, on comparing the living plants, they were found to be distinct species. *T. Manghas* bears delicate white flowers, destitute of fragrance. If both species are found in Madagascar, or a species with similar properties to the Indian, it would readily account for the different results in the trial by Ordeal, and the correctness of the statement of the natives, that "there are two kinds, one *poison*, the other *only emetic*." The milky juice of *T. Manghas* is said to be used as a purgative, and, according to Rumphius, the natives boil and eat the leaves mixed with other pot-herbs, which thus act as a gentle laxative. The bark is also used in Java and Amboyna as a familiar cathartic, the action of which is said to be very similar to that of senna. *Manghas* is the name given to the tree in its native country.

Sydney, New South Wales, July 14, 1868.

DR. J. D. HOOKER'S PRESIDENTIAL ADDRESS AT THE MEETING OF THE BRITISH ASSOCIATION.

All botanists, of whatever shade of opinion, must have beheld with gratification Dr. Hooker's presiding over the Norwich Meeting of the British Association. That one of our number should some day be the chosen leader of the great annual gathering of men of science in this country, was a right to which we botanists were entitled. That this right should have been so long withheld has been a matter of regret; that it has at last been granted, a tardy act of justice. Dr. Hooker, out-and-out Darwinian though he be, is a good representative man, and in his election his colleagues were duly honoured. His presidential

address, which we are compelled to give in a condensed form in those parts not relating to botany, will be read with interest, and must be received with that indulgence which he himself claims for it. Indeed, in the very outset, he himself states some of the objections which may be urged against it. The gravest, however, he has omitted to mention; and that is, the polemical turn displayed when he comes to dwell upon a review on Mr. Darwin's last book in the 'Athenæum,'—the same review previously commented upon in Mr. Bentham's annual address at the Linnean Society. It is rather undignified that, in their addresses, the presidents of two great scientific bodies like the Linnean Society and the British Association ventured upon a polemic with an anonymous writer of a review which appeared in a popular periodical, though that periodical was the 'Athenæum,' especially when the scientific bodies they represented are, as such, not at all committed to Darwinism. The 'Athenæum' review, evidently written in great haste, cannot have been such an insignificant production as made out, when two eminent men, as Messrs. Bentham and J. D. Hooker are on all hands acknowledged to be, were for months pondering over a refutation of it, to be presented on two separate solemn occasions to bodies of men who, whilst fully appreciating Mr. Darwin's careful observations, are much divided in their opinions with regard to the value of his theories. That Dr. Hooker's address should praise the labours of all those who support Darwinian notions, and should ignore those who hold opposite views, is another defect which should have been avoided. On great occasions men are expected to rise above the level of common everyday life. "Noblesse oblige" is a maxim advantageously exercised in scientific intercourse. Nor did Dr. Hooker display much tact when he held up the Kew Museum, of which he is the head, as a model for imitation. Such remarks would have come much better, and with more force, from independent sources. On the whole, then, Dr. Hooker did not take proper advantage of the great opportunity that presented itself, as will be seen from the abstract we now give:—

"Thirty years," said Dr. Hooker, "will to-morrow have elapsed since I first attended a meeting of the British Association; it was the one which opened at Newcastle on the 20th of August, 1838. On that occasion the Council of the Association resolved to recommend to her Majesty's Government the dispatch of an expedition to the Antarctic regions under the command of Captain James Ross; and it was from Newcastle that I wrote to my friends announcing my resolve to accompany it in whatever capacity I could obtain a situation amongst its officers. It was thus that my scientific career was first shaped; and it is to this expedition, which was one of the very earliest results of the labours of the British Association, that I am indebted for the honour you have conferred upon me in placing me in your president's chair. If I now look back with pride to those immediately following years, when I had a share, however small, in the discovery of the Antarctic Continent, the Southern Magnetic Poles, the Polar Barrier, and the ice-clad Volcano of Victoria Land, I do so also with other and far different feelings.

"The impression is very prevalent that the Presidential address should either be a scientific *tour de force*, philosophical and popular, or a *résumé* of

the progress of one or more of the important branches of science; and this view of the duty has greatly embarrassed me, inasmuch as I am unable to fulfil either of these requirements. On various occasions during the last half-year I have essayed to fulfil the wishes of my botanical friends, that I should either discuss the phenomena of the vegetable kingdom in their relation to collateral sciences, or sketch the rise and progress of scientific botany during the present century, or a portion of it; but every such essay has been quickly frustrated by the pressure of official duties.

"For my own part I propose to offer you some remarks upon several matters to which the attention of your Council was directed when at Dundee; and then upon some of the great advances that have been made in botany during the last few years; after which I shall allude to some matters connected with that dawning science, the early history of mankind, a theme which will be a distinguishing collateral feature of the Norwich Association.

"My first duty as President is the pleasant one of introducing to you the members of the International Congress of Prehistoric Archæology.

"The next subject which I have to bring officially before you will interest the members of the Congress no less than ourselves, and relates to the action of a committee which your Council appointed, to represent to the Secretary of State for India "the great and urgent importance of adopting active measures to obtain reports on the physical form, manners, and customs of indigenous populations of India, and especially of those tribes which are still in the habit of erecting Megalithic monuments. . . .

"The Council of the Association appointed a committee to report upon the subject of the Government of the Natural History Collections of the British Museum, which resulted in a deputation, who represented to the Prime Minister, in the name of the Council, that it was desirable that these collections be placed under the control of a single officer, who should be directly responsible to a Minister of the Crown; and that this opinion was shared by an overwhelming majority of British naturalists. Of the objections to the present system of government by trustees, some of the most grave have been stated by Mr. Andrew Murray in a communication (Report for 1867, Transactions of Sections, p. 95) made to the Biological Section at Dundee; to which I would only add, that though the zoological collections are the finest in the world, and the geological and palæontological of prodigious extent and value, there are, of the forty-five trustees, only three who have any special knowledge whatsoever of the branches of science these collections illustrate; that since Sir Joseph Banks's death, nearly half a century ago, no botanist has ever been appointed a trustee, though the Banksian herbarium and botanical library, then amongst the most valuable in Europe, were left by their owner to the nation; and, in fine, that the interests of botany have by the trustees been greatly neglected.

"Much as has been written upon the uses of museums, I believe that the subject is still far from being exhausted, for in the present state of education in this country these appear to me to afford the only means of efficiently teaching to schools the elements of zoology and physiology. I say in the present state of education, because I believe it will be many years before we have

schoolmasters and mistresses trained to teach these subjects; and many more years before either provincial or private schools will be supplied with such illustrative specimens as are essential for the teacher's purposes.

"Confining myself to the consideration of provincial and local museums, and their requirements for educational purposes, each should contain a series of specimens illustrating the principal and some of the lesser divisions of the animal and vegetable kingdoms, so disposed in well-lighted cases as that an inquiring observer might learn therefrom the principles upon which animals and plants are classified, the relations of their organs to one another and to those of their allies, the functions of those organs, and other matters relating to their habits, uses, and place in the economy of nature. Such an arrangement has not been carried out in any museum known to me, though partially attained in that of Ipswich; it requires some space, many pictorial illustrations, magnified views of the smaller organs and their structure, and copious legible descriptive labels, and it should not contain a single specimen more than is wanted. The other requirements of a provincial museum are, complete collections of the plants and animals of the province, which should be kept entirely apart from the instructional series, and from everything else. The curator of the museum should be able to give elementary demonstrations (not lectures, and quite apart from any powers of lecturing that he may possess) upon this classified series, to schools and others, for which a fee should be charged, and go to the support of the institution; and the museum might be made available (under similar conditions of payment) for lectures and other demonstrations. Much of the utility of museums depends on two conditions often strangely overlooked, viz. their situation and their lighting and interior arrangements. The provincial museum is too often huddled away almost out of sight in a dark, crowded, and dirty thoroughfare, where it pays dear for ground-rents, rates, and taxes, and cannot be extended; the object, apparently, being to catch country people on market days. Such localities are frequented by the townspeople only when on business, and when they consequently have no time for sight-seeing. In the evening, or on holidays, when they could visit the museum, they naturally prefer the outskirts of the town to its centre. The museum should be in an open grassed square or park, planted with trees, in, or in the outskirts of, the town,—a main object being to secure cleanliness, a cheerful aspect, and space for extension. Now, vegetation is the best interceptor of dust, which is injurious to the specimens as well as unsightly, whilst a cheerful aspect, and grass and trees, will attract visitors, and especially families and schools. If the external accessories of provincial museums are bad, the internal are often worse; the rooms are usually lighted by windows on one side only, so that the cases between the walls are dark, and those opposite the windows reflect the light when viewed obliquely, and, when viewed in front, the visitor stands in his own light. For provincial museums, when space is an object, there is no better plan than rectangular long rooms, with opposite windows on each side, and buttress cases projecting into the room between each pair of windows. This arrangement combines economy of space with perfect illumination, and affords facilities for classification. Upon this plan the large

museum at Kew is built, where the three principal rooms are 70 feet long by 25 feet wide, and each accommodates 1000 square feet of admirably lighted cases, 6700 feet of wall room for pictures and for portraits of naturalists, besides two fireplaces, four entrances, and a well staircase, 11 feet each way. A circular building, with cases radiating from the wall between the windows, would probably be the best arrangement of all. A light spiral staircase in the centre would lead to the upper stories. Two or more of the bays might be converted into private rooms, without disturbing the symmetry of the interior or intercepting the lighting of the cases. The proportions of the basement and first floor might be such as to admit of additional stories being added, and the roof be so constructed as to be removable without difficulty when an additional story was required; furthermore, rectangular galleries might be built, radiating from the central building, and lighted by opposite windows, with buttress cases between each pair of windows.

"In respect of its Natural History Collections the position of the British Museum appears to me to be a disadvantageous one; it is surrounded by miles of streets, including some of the principal metropolitan thoroughfares, which pour clouds of dust and the products of coal combustion into its area day and night. My remarks on the British Museum convey no reflection on the able officers who have, in so short a time, formed this wonderful collection. For some years past it has been considered to be the finest in the world. This is due to the energy and ability of the keepers and curators; and in mentioning them, I would wish to pay a passing tribute to the merits of the venerable Dr. Gray, who has devoted his life to the development of his department with a singleness of purpose, liberality, and zeal, that are beyond all praise.

"In my own special science, the greatest advances that have been made during the last ten years have been in the department of fossil botany and vegetable physiology. In the past history of the globe, two epochs stand prominently out—the Carboniferous and the Miocene—for the abundant material they afford, and the light they consequently throw on the early condition of the vegetable kingdom. Why plants should have been so much more lavishly preserved during these than during some of the intervening or earlier epochs, we do not rightly know; but the comparative poverty of the floras of these latter is one amongst the strongest evidences of the imperfection of the geological record. Our knowledge of coal plants, which, since the days of Sternberg, Brongniart, and Lindley and Hutton, has been chiefly advanced by Gœppert and Unger on the Continent, and by Dawson in Canada, has received very important accessions of late through the untiring energy of Mr. Binney, of Manchester, who has devoted nearly thirty years to the search for those rarely found specimens which exhibit the internal structure of the plant. His elaborate descriptions of the most abundant, and, till his researches, the least understood plant of the coal-measures, *Calamites*, has just appeared in the memoirs of the Palæontographical Society; and some of Mr. Binney's materials having also formed the subject of a very recent and valuable paper (Seemann's 'Journal of Botany,' 1867, p. 349) by Mr. Carruthers, of the British Museum, I may quote their joint results as one. These show that *Calamites* is an actual

member of the existing family of *Equisetaceæ*, which contained previously but one genus, that of the common Mare's-tails of our river-banks and woods; as also that nearly a dozen other genera of coal-measure plants may be referred to it. This affinity of *Calamites* had, indeed, been guessed at before, and the genera now referred to it, having been founded on mere fragments, were always doubtful; but the value of these positive identifications is none the less on these accounts. It may hereafter prove of some significance that these *Calamites*, which in the coal epoch assumed gigantic proportions, and presented multitudinous forms and very varied organs of growth, are now represented by but one genus, differing most remarkably from its prototype in size, and the simplicity and uniformity of its vegetable organs. Passing to the Tertiary flora, the labours of Count Saperte in France, of Gaudin and Strozzi, and of Massolongha in Italy, as Lesquereux in America, and above all, of Heer in Switzerland, have within the last ten years accumulated a vast number of species of fossil plants; and if the determinations of the affinities of the majority are dependible, they prove the persistence throughout the Tertiary strata of many interesting families and genera, and the rarity of others than these. Here, however, much value cannot be attached to negative evidence. Almost the only available materials for determining the affinities of the vast majority of those Tertiary plants are their mutilated leaves, and, unlike the bones of vertebrate animals and the shells of mollusks, the leaves of individual plants are extremely variable in all their characters. Furthermore, the leaves of plants of different natural families, and of different countries, mimic one another to such a degree, that in the case of recent plants every botanist regards these organs as most treacherous guides to affinity. Of the structural characters, which are drawn from the internal organs of plants, and especially from their fruit, seeds, and flowers, few traces are to be found in the fossils, and yet it is from them exclusively that the position of a recent plant in the vegetable kingdom can be certified. An instructive instance of over-reliance on leaves, and perhaps, too, on preconceived ideas, happened not long ago to a palæontologist of such distinguished merit that his reputation cannot suffer from an allusion to it. In the course of his labours over some imperfect specimen from a most interesting locality, he referred three associated impressions of fossil leaves to three genera, belonging to as many different families of plants, and was thus helped to what would have been some important conclusions as to the vegetation of the period in which they were deposited. A subsequent observer, who was a botanist, but not a palæontologist, declares these three supposed genera to be the three leaflets of one leaf, of one plant, and that the common Blackberry, which still grows on the spot. Which of the two is right, I do not say; the fact shows to what opposite conclusions different observers of the same fossil materials may be led. If, however, much is uncertain, all is not so, and the science has of late made sure and steady progress, and developed really grand results. Heer's labours on the Miocene and Pliocene floras especially are of the highest value and interest. His conclusions regarding the flora of the Bovey Tracey coal-beds (for the publication of which, in a form worthy of their value and of their author's merit, we are indebted to the wise liberality of Miss Burdett

Coutts) are founded on a sufficient number of absolute determinations; and his more recent 'Flora Fossilis Arctica' threatens to create a revolution in Tertiary geology. In this latter work, Professor Heer shows, on apparently unassailable evidence, that forests of Austrian, American, and Asiatic trees flourished during the Miocene period in Iceland, Arctic Greenland, Spitzbergen, and the Polar American Islands, in latitudes where such trees could not now exist under any conceivable conditions or positions of land, or sea, or ice, and leaving little doubt but that an arboreous vegetation once extended to the Pole itself. Discoveries such as these appear at first actually to retard the progress of science by confounding all previous geological reasoning, as to the climate and condition of the globe during the Tertiary epoch.

"I have said that the greatest botanical discoveries made during the last ten years have been physiological, and I here allude especially to the series of papers on the 'Fertilization of Plants' which we owe to Mr. Darwin. You are aware that this distinguished naturalist, after accumulating stores of facts in geology and zoology during his circumnavigation of the globe with Captain FitzRoy, espoused the doctrine of the continuous evolution of life, and by applying to it the principles of natural selection, evolved his theory of the Origin of Species. Instead of publishing these views as soon as conceived, he devoted twenty more years to further observation, study, and experiment, with the view of maturing or subverting them. Amongst the subjects requiring elucidation or verification were many that appertained to botany, but which had been overlooked or misunderstood by botanical writers, and these he set himself to examine rigorously.

"The firstfruits of his labours were his volume on the 'Fertilization of Orchids,' undertaken to show that the same plant is never continuously fertilized by its own pollen, and that there are special provisions to favour the crossing of individuals. As his study of the British species advanced, he became so interested in the number, variety, and complexity of the contrivances he met with, that he extended his survey to the whole family; and the result is a work of which it is not too much to say that it has thrown more light upon the structure and functions of the floral organs of this immense and anomalous family of plants than had been shed by the labours of all previous botanical writers. It has, further, opened up entirely new fields of research, and discovered new and important principles, that apply to the whole vegetable kingdom.

"This was followed by his paper on the two well-known forms of the Primrose and Cowslip ('Journal of the Linnean Society of London,' vol. vi. p. 77), popularly known as the pin-eyed and thrum-eyed. These forms he showed to be sexual and complementary; their diverse functions being to secure, by their mutual action, full fertilization, which he proved could only take place through insect agency. In this paper he established the existence of homomorphic or legitimate, and heteromorphic or illegitimate unions amongst plants, and details some curious observations in the structure of the pollen. The result of this, perhaps more than any other of Mr. Darwin's papers, took botanists by surprise,—the plants being so familiar, their two forms of flower so well known to every intelligent observer, and his explanation so simple. For myself, I felt

that my botanical knowledge of these homely plants had been but little deeper than Peter Bell's, to whom

'A Primrose by the river's brim
A yellow Primrose was to him,
And it was nothing more.'

"Analogous observations on the dimorphism of Flax-flowers and their allies ('Journal of the Linnean Society,' vol. vii. p. 69) formed the subsequent paper; during which he made the wonderful discovery, that in the common Flax the pollen of one form of flower is absolutely impotent when applied to its own stigma, but invariably potent when applied to the stigma of the other form of flower; and yet pollens and stigmas of the two kinds are utterly undistinguishable under the highest powers of the microscope.

"His third investigation is a very long and laborious one on the common Loosestrife, *Lythrum Salicaria* ('Journal of the Linnean Society,' vol. viii. p. 169), which he showed to be trimorphic; this one species having three kinds of flowers, all annually abundantly produced, and as different as if they belonged to different species; each flower has, further, three kinds of stamens, differing in form and function. We have in this plant then, six kinds of pollen, of which five at least are essential to complete fertility, and three distinct forms of style. To prove these various differences, and that the coadaptation of all these stamens and pistils was essential to complete fertility, Mr. Darwin had to institute eighteen sets of observations, each consisting of twelve experiments—216 in all. Of the labour, care, and delicacy required to guard such experiments against the possibility of error, those alone can tell who know experimentally how difficult it is to hybridize a large-flowered plant of simple form and structure. The results in this case and in those of a number of allied plants experimented on at the same time, is what the author's sagacity predicted; the *rationale* of the whole was demonstrated, and he finally showed not only how nature might operate in bringing these complicated modifications into harmonious operation, but how, through insect agency, she does this, and why she does it too.

"It is impossible even to enumerate here the many important generalizations that have followed from these and other papers of Mr. Darwin's on the fertilization of plants; some that appear to be commonplace at first sight are really the most subtle, and, like many other apparent commonplaces, are what, somehow, never occur to commonplace minds; as, for instance, that all plants with conspicuously-coloured flowers, or powerful odours, or honeyed secretions, are fertilized by insects; all with inconspicuous flowers, and especially such as have pendulous anthers, or incoherent pollen, are fertilized by the wind; from whence he infers that, before honey-feeding insects existed, the vegetation of our globe could not have been ornamented with bright-coloured flowers, but consisted of such plants as Pines, Oaks, Grasses, Nettles, etc.

"The only other botanical paper of Mr. Darwin's to which I can especially allude is that 'On the Habits and Movements of Climbing Plants' ('Journal of the Linnean Society,' vol. ix. p. 1), which is a most elaborate investigation

into the structure, modification, and functions of the various organs by which plants climb, twine and attach themselves to foreign objects. In this he reviews every family in the vegetable kingdom, and every organ used by any plant for the above purposes. The result places the whole subject in a totally new light before us. The guesses, crude observations, and abortive experiments that had disfigured the writings of previous observers are swept away; organs, structures, and functions, of which botanists had no previous knowledge, are revealed to them, and the whole investigation is made as clear as it is interesting and instructive.

"The value of these discoveries, which add whole chapters to the principles of botany, is not theoretical only; already the horticulturist and agriculturist have begun to ponder over them, and to recognize in the failure of certain crops the operation of laws that Mr. Darwin first laid down. What Faraday's discoveries are to telegraphy, Mr. Darwin's will assuredly prove to rural economy, in its widest sense and most extended application.

"Another instance of successful experiment, in physiological botany, is Mr. Herbert Spencer's observations on the circulation of the sap and formation of wood in plants. As is well known, the tissues of our herbs, shrubs, and trees, from the tips of their roots to those of their petals and pistils, are permeated by tubular vessels. The functions of these have been hotly disputed, some physiologists affirming that they convey air, others fluids, others gases, and still others assigning to them far-fetched uses of a wholly different nature. By a series of admirably contrived and conducted experiments, Mr. Spencer has not only shown that these vessels are charged at certain seasons of the year with fluid, but that they are intimately connected with the formation of wood. He further investigates the nature of the special tissues concerned in this operation, and shows, not merely how they may act, but to a great extent how they do act.

"Mr. Darwin's recent two volumes, 'On Animals and Plants under Domestication,' are a catacomb of data, observations, and experiments such as assuredly no one but himself could produce. It is hard to say whether they are most remarkable for the number and value of the new facts they disclose, or for the array of small forgotten or overlooked observations, neglected by some naturalists, and discarded by others, which, under his mind and eye, prove to be of first-rate scientific importance. An eminent surgeon and physiologist (Mr. James Paget) has remarked to me, *à propos* of these volumes, that they exemplify, in a most remarkable manner, that power of utilizing the waste materials of other scientific men's laboratories, which is a very characteristic feature of their author.

"It is in this work that Mr. Darwin expounds his new hypothesis of Pangenesis, which certainly correlates, and may prove to contain the *rationale* of all the phenomena of reproduction and inheritance. You are aware that every plant or animal commences its more or less independent life as a single cell, from which is developed an organism more or less closely similar to its parent. One of the most striking examples I can think of is afforded by a species of *Begonia*, the stalks, leaves, and other parts of which are superficially studded

with loosely-attached cellular bodies. Any one of these bodies, if placed under favourable conditions, will produce a perfect plant, similar to its parent. You may say that these bodies have inherited the potentiality to do so; but this is not all, for every plant thus produced, in like manner develops on its stalks leaves and myriads of similar bodies, endowed with the same property of becoming new plants; and so on, apparently interminably. Therefore the original cell that left the grandparent not only carried with it this so-called potentiality, but multiplied it and distributed it with undiminished power through the other cells of the plant itself produced; and so on for countless generations. What is this potentiality, and how is this power to reproduce thus propagated, so that an organism can, by single cells, multiply itself so rapidly, and within very narrow limits, so surely and so interminably? Mr. Darwin suggests an explanation by assuming that each cell or fragment of a plant (or animal) contains myriads of atoms or gemmules, each of which gemmules he supposes to have been thrown off from the separate cells of the mother plant, the gemmules having the power of multiplication, and of circulating throughout the plant; their future development he supposes to depend on their affinity for other partially-developed cells in due order of succession. Gemmules which do not become developed may, according to his hypothesis, be transmitted through many succeeding generations, thus enabling us to understand many remarkable cases of reversion or atavism. Thus, according to this hypothesis, not only have the normal organs of the body the representative elements of which they consist diffused through all the other parts of the body, but the morbid states of these, as hereditary diseases, malformations, etc., all actually circulate in the body as morbid gemmules.

"As with other hypotheses based on the assumed existence of structures and elements that escape our senses, by reason of their minuteness or subtlety, this of Pangenesis will approve itself to some minds, and not to others. To some these inconceivably minute circulating gemmules will be as apparent to the mind's eye as the stars of which the milky way is composed; others will prefer embodying the idea in such a term as potentiality, a term which conveys no definite impression whatever, and they will like it none the less on this account.

"Whatever be the scientific value of these gemmules, there is no question but that to Mr. Darwin's enunciation of the doctrine of Pangenesis we owe it that we have the clearest and most systematic *résumé* of the many wonderful phenomena of reproduction and inheritance that has yet appeared; and against the guarded entertainment of the hypothesis, or speculation if you will, as a means of correlating these phenomena, nothing can be urged in the present state of science. The President of the Linnean Society, a proverbially cautious naturalist, thus well expresses his own ideas of Pangenesis:—'If (he says) we take into consideration how familiar mathematical signs and symbols make us with numbers and combinations, the actual realization of which is beyond all human capacity, how inconceivably minute must be those emanations which most powerfully affect our sense of smell and our constitutions; and if, discarding all previous notions, we follow Mr. Darwin step by step in applying

his suppositions to the facts set before us, we must, I think, admit that they may explain some, and are incompatible with others; and it appears to me that Pangenesis will be admitted by many as a provisional hypothesis, to be further tested, and to be discarded only when a more plausible one shall be brought forward.'

"Ten years have elapsed since the publication of 'The Origin of Species by Natural Selection,' and it is hence not too early now to ask what progress that bold theory has made in scientific estimation. The most widely-circulated of all the journals that give science a prominent place on their title-page, the 'Athenæum,' has very recently told to every country where the English language is read, that Mr. Darwin's theory is a thing of the past; that natural selection is rapidly declining in scientific favour, and that as regards the above two volumes on the 'Variations of Animals and Plants under Domestication,' they 'contain nothing more in support of origin by selection, than a more detailed re-asseveration of his guesses founded on the so-called variations of pigeons.' Let us examine for ourselves into the truth of these inconsiderate statements. Since the 'Origin' appeared, ten years ago, it has passed through four English editions, two American, two German, two French, several Russian, a Dutch, and an Italian; whilst of the work on 'Variation,' which first left the publisher's house not seven months ago, two English, a German, Russian, American, and Italian editions are already in circulation. So far from natural selection being a thing of the past, it is an accepted doctrine with almost every philosophical naturalist, including, it will always be understood, a considerable proportion who are not prepared to admit that it accounts for all that Mr. Darwin assigns to it.

"Reviews on 'The Origin of Species' are still pouring in from the Continent; and Agassiz, in one of the addresses to his *collaborateurs* on their late voyage to the Amazons, directs their attention to this theory as a primary object of the expedition they were then undertaking. [Agassiz himself states that the chief aim of his expedition was 'to obtain the means of showing that the transmutation theory is wholly without foundation in facts,' and in this he fully succeeded.—EDITOR.] I need only add, that of the many eminent naturalists who have accepted it, not one has been known to abandon it; that it gains adherents steadily; and that it is, *par excellence*, an avowed favourite with the rising school of naturalists; perhaps, indeed, too much so, for the young are apt to accept such theories as articles of faith, and the creed of the student is but too likely to become the shibboleth of the future professor.

"The scientific writers who have publicly rejected the theories either of continuous evolution or of natural selection, or both, take their stand upon physical grounds, or metaphysical, or both. Of those who rely on the metaphysical, their arguments are usually strongly imbued with theological prejudice, and even odium, and, as such, beyond the pale of scientific criticism. I long ago arrived at the conclusion, so well put by Agassiz, where he says, 'We trust that the time is not distant when it will be universally understood that the battle of the evidences will have to be fought on the field of physical science, and not on that of the metaphysical.' Many of the metaphysician's objections have

been controverted by that champion of natural selection, Mr. Darwin's true knight, Alfred Wallace, in his papers on 'Protection' and 'Creation by Law,' etc., in which the doctrines of 'Continual Interference,' and the 'Theory of Beauty,' and kindred subjects, are discussed with admirable sagacity, knowledge, and skill. But of Mr. Wallace and his many contributions to philosophical biology it is not easy to speak without enthusiasm, for, putting aside their great merits, he, throughout his writings, with a modesty as rare as I believe it to be unconscious, forgets his own unquestioned claims to the honour of having originated, independently of Mr. Darwin, the theories which he so ably defends.

"On the score of geology, the objectors rely chiefly on the assumed perfection of the geological record; and since almost all who believe in its imperfection, and many of the other school, accept the theories both of evolution and natural selection, wholly or in part, there is no doubt but Mr. Darwin claims the great majority of geologists. Of these, one is in himself a host, the veteran Sir Charles Lyell, who, after having devoted whole chapters of the first editions of his 'Principles' to establishing the doctrine of special creations, abandons it in the tenth, and this, too, on the showing of a pupil; for in the dedication of his earliest work, 'The Naturalist's Voyage,' to Sir C. Lyell, Mr. Darwin states that the chief part of whatever merit himself or his works possess, has been derived from studying the 'Principles of Geology.' I know no brighter example of heroism of its kind than this, of an author thus abandoning, late in life, a theory which he had for forty years regarded as the very foundation of a work that had given him the highest position attainable amongst scientific writers. Well may he be proud of a superstructure, raised on the foundations of an insecure doctrine, when he finds that he can underpin it, and substitute a new foundation, and, after all is finished, survey his edifice, not only more secure, but more harmonious in its proportions, than it was before; for assuredly the biological chapters of the tenth edition of the 'Principles' are more in harmony with the doctrine of slow changes in the history of our planet, than were their counterparts in the former editions.

"To the astronomer's objections to these theories I turn with diffidence; they are almost vehemently urged in what is in many respects the cleverest critique of them that I have hitherto met with, and which appeared in the 'North British Review.' It is anonymous. I am wholly ignorant of its author, and I regret to find that, in common with the few other really able hostile critiques, it is disfigured by a dogmatism that contrasts unfavourably with Mr. Darwin's considerate treatment of his opponents' methods and conclusions. In estimates that are calculated from data that are themselves hypothetical in a great degree, there are no principles upon which we are warranted in assuming the speculations of the astronomer to be more worthy of confidence than those of the biologist. No science is really perfect,—certainly not that which lately erred 2,000,000 miles in so fundamental a datum as the earth's distance from the sun. Have Faraday and Von Beer interpreted no oracles of nature fully and clearly? Have Cuvier and Dalton not prophesied, and been true prophets?

"Claims to queenship do not accord with the spirit of science; rather would I liken the domain of natural knowledge to a hive, in which every comb is a science, and truth the one queen over them all.

"It remains to say a few words on some prospects which this Norwich meeting opens. A new science has dawned upon us, that of the early history of mankind. Prehistoric archæology (including, as it does, the origin of language and of art) is the latest to rise of a series of luminaries that have dispelled the mists of ages, and replaced time-honoured traditions by scientific truths.

"A great deal has been said and written of late about the respective attitudes of religion and science. Let each pursue the search for truth. It will be in vain that each regards the other's pursuit from afar, and, turning the object-glass of his mind's telescope to his eye, is content when he sees how small the other looks. One of the deepest thinkers, Mr. Herbert Spencer ('First Principles,' by Herbert Spencer, ed. ii. p. 46), has said, 'If religion and science are to be reconciled, the basis of the reconciliation must be this deepest, widest, and most certain of facts, that the power which the universe manifests to us is utterly inscrutable.' The bond that unites the physical and spiritual history of man, and the forces which manifest themselves in the alternate victories of mind and of matter over the actions of the individual, are, of all the subjects that physics and psychology have revealed to us, the most absorbing, and perhaps inscrutable. In the investigation of their phenomena is wrapped up that of the past and the future, the whence and the whither, of his existence; and after a knowledge of these the human soul still yearns."

LIST OF SAMOAN FERNS,

Collected and arranged according to Hooker's 'Species Filicum,' by Rev. S. Powell.

The figures attached to the species are Powell's numbers.

Tribe 1. Gleicheniaceæ.

Gleichenia dichotoma, 5.
G. dichotoma, *var.* Mett., 146.

Tribe 2. Polypodiaceæ.

Suborder 1. *Cyatheæ.*

Cyathea (Eucyathea) leucolepis, *Mett.*, 20.
Alsophila (Eualsophila) lunulata, *Forst.*, 85.
A. truncata, *Brack.*, 119.

Suborder 2. *Dicksonieæ.*

Dicksonia (Balantium) Berteroana, *Hook.*, 45.

D. (B.) dubia, *Gaud.*, 117.
Hymenophyllum (Eudicksonia) dilatatum, *Sw.*, 105.
H. polyanthos, *Sw.*, 107.
H. Feejeense, *Brack.*, 106.
Trichomanes (Eutrichomanes) muccoides, *Sw.*, 137.
T. (E.) parvulum, *Poir.*, 144.
T. (E.) pyridiferum,* *L.*, 102.
T. (E.) digitatum, *Sw.*, 108.
T. (E.) Filicula, *Bory*, 100.
T. (E.) humile, *Forst.*, 101 and 262.
T. (E.) Javanicum, *Bl.*, 23.
T. (E.) rigidum, *Sw.*, 34.
T. (E.) meifolium, *Bory*, 35 and 129.
T. (E.) longisetum, *Bory*, 36.
T. (E.) maximum, *Bl.*, 24.
T. (E.) pallidum, *Bl.*, 104.
T. (E.) caudatum, *Brack.*, 103.
T. (E.) peltatum, n. sp., *Baker*, 125.
T. (E.) Powellii, *Baker*, 128.

Suborder 3. *Davallieæ.*

Davallia (humata) heterophylla, 16.
D. (h.) parallela, 17.
D. (h.) alpina, 136.
D. (Prosaphia) Emarsonii, 123.
D. (Eudavallia) solida, 32.
D. (E.) elata, 31.
D. (E.) campyleura, 117*b*.
D. (Odontoloma) triquetra, n. sp., *Baker*.
D. (O.) pulchella, *Hook.*, 122.
D. (Microlepia) polypodoides, *Don*, 56.

Suborder 4. *Lindsaceæ.*

Lindsæa (Schizoloma) ensifolia, 18.
L. (S.) nitens, 2.†

Suborder 5. *Pterideæ.*

Adiantum lunulatum, *Burm.*, 19.
Hypolepis tenuifolia, 57.
Pellæa, *vel* Allosorus geraniæfolia, 15.
Pteris (Eupteris) crenata, *Sw.*

* I think it is doubtful whether Mr. Baker has rightly determined this.
† Mr. Baker states that this is identical with *solitusa* and *davalloides*. It is also much like *propinqua*.

P. (E.) quadriaurita.
P. (E.) gigantica, sp. 12 ft., 140.
P. (Litobrochia) aculeata, *Sw.*, 41.
P. (L.) tripartita, *Sw.*, 74.
P. (L.) incisa, *var.* aurita, 120.

Suborder 6. *Lomarieæ.*

Lomaria (Plagyogyria) procera, 91.
Blechnum orientale, *L.*, 33.

Suborder 7. *Asplenieæ.*

Asplenium (Thamnopteris) Nidus, 146.
A. (Euasplenium) Figiense, *Brack.*, 72*a*.
A. (E.) emarginatum, *Beauv.*, 72.
A. (E.) multilineatum, *Hook.*, 92.
A. (E.) tenerum, *Forst.*, 39.
A. (E.) resectum, *Sm.*, 142.
A. (E.) resectum, var. n.?, 132.
A. (E.) horridum, *Klfs.*, 38.
A. (E.) falcatum, *Lan.*, 44.
A. (E.) cuneatum, *Lam.*, 65*a*.
A. (E.) laserpitiifolium, *Lam.*, 65.
A. (E.) Powellii, *Baker*, 44.
A. sylvaticum, *Pr.*, 61.
A. arborescens, *Mett.*, 30.
A. (Anisogonium) esculentum, *Pr.*, 62.
A. (A.) decussatum, *Sw.*, 22.
A. (A.) Japonicum, 99.

(*To be continued.*)

CORRESPONDENCE.

Lathyrus tuberosus.

Christopher Parsons, Esq., of Shoebury Hall, wrote to me about a month ago to say that, having heard that this plant grew in Cauvey Island, he had been over to see, and found that it was so abundant over about twelve acres that this part was called the "Gay Marsh," from the profusion of its bright flowers. The tubers ran so deep, that the farmers were unable to eradicate it. There is a tradition in the island that it was introduced by the Dutch when they embanked the land about two centuries ago. Mr. Newbould has since been to visit the spot, and will be much better able to give you further particulars respecting it.

G. S. Gibson.

BOTANICAL NEWS.

Dr. Karsten, of Berlin, has been elected Professor of Vegetable Physiology in the University of Vienna, vacated by the retirement from office of Dr. F. Unger.

It is our painful duty to record the death, by yellow fever, of Mr. Richard Pearce, well known as the collector and introducer of numerous ornamental garden plants from the wilds of tropical America, which took place at Panama in June last. He had lately formed an advantageous arrangement with Mr. William Bull, of Chelsea, the well-known enterprising plant merchant, and started full of hope and ardour once more for the countries in which he had already achieved such brilliant success as a collector. Dr. Seemann had given him letters to his agent, Dr. Kratochwill, at Panama, and, together with him, he was about to embark in a schooner of the Central American Association for the little-known river Bayano, when the fatal disease overtook him. Dr. Kratochwill never left him; and the British Consul, and several leading men of Panama, followed him to the grave.

In the late competition for the Curatorship of the Museums of the Pharmaceutical Society of Great Britain, Mr. James Collins was the successful candidate.

The 'Moniteur' gives an interesting account of a tree called "Haofash," which grows on the mountains of Baria, in French Cochin-China:—"It grows wild in the forests hidden among Lianas and other creepers, which render the wooded mountains of that country almost impervious to the traveller. Nor do the inhabitants, generally speaking, know the botanical or medicinal properties of this plant, so that it remains a secret in the hands of the bonzes and physicians. MM. Condamine and Blanchard, two French travellers, have at length succeeded, after much fruitless research, in finding this tree,—having conquered the conscientious scruples of a worthy bonze, who seems to have been perfectly alive to the virtues of the French napoleon. The Annates, who gain their livelihood by selling the bark of the Haofash to professional men, wait till the tree has attained its third year before stripping it of its bark, its usual height at that age being about twenty-four feet, with a circumference of a foot and a half or thereabouts. The operation is performed in June, when the tree has neither blossoms nor fruit; it is hewn down, and then denuded of its bark methodically in slices about two feet long and three or four inches broad. These strips are made up into bundles weighing from thirty to forty pounds; a man will carry two of them at a time fastened to the ends of a pole resting on his shoulders. The bark of the Haofash is outwardly of an ash-grey colour, and inwardly brown; it has a strong aromatic smell, and a slightly bitter taste. When chewed it reddens the saliva; it is a powerful styptic; it is administered by the physicians of the country in cases of colic, diarrhœa, and dysentery. The dose of a decoction is generally from six to ten grammes in one hundred grammes of water boiled in one-fifth, but sometimes they merely put a bit of the bark into hot water, occasionally rubbing the former against the rough sides of the earthen pot used for the purpose, and then make the patient drink the liquid, which is then sufficiently strong to cure a simple colic.

W. Fitch, del. et lith.

Vincent Brooks, Day & Son, Imp.

SCIRPUS PARVULUS, R. et S.

By A. G. More, Esq., F.L.S., M.R.I.A.

(Plate LXXXV.)

Ess. Char. Plant growing in small tufts, which are connected by thread-like stolons, terminating in minute tubers. Stems green above, white below, hyaline and cellular, each with one adpressed membranous sheath and no leaves. Spikes upright, terminal. Glumes ovate, transparent, with a green dorsal nerve. Stigmas 3. Fruit obovate, trigonous, smooth, surrounded by three (or "four to six") scabrous bristles.

Syn. *Scirpus parvulus*, Rœmer et Schultes, Syst. Veget. ii. 124 (1817); Kunth, En. Plant. ii. 157; Wahlenberg, Fl. Suec. 1095; Fries, Summa Veg. Scand. 69; Koch, Synopsis (ed. 2), ii. 854; Babington, Man. (ed. 6), 373; Hooker and Arnott, Brit. Flor. (ed. 8), 496; Bromfield in Phytologist, o. s., iii. 1028; Grenier et Godron, Flor. Franc. iii. 378; Lloyd, Flore de l'Ouest (ed. i.) 478; Boreau, Flore du Centre (ed. 3), 659; Bertoloni, Fl. Ital. i. 277; Parlatore, Fl. It. ii. 78; Ledebour, Fl. Ross. iv. 216.—*Scirpus nanus*, Sprengel, Pug. i. 4 (1813); Wallroth, Ann. Bot. 7; Hornemann, Hort. Hafn. 113 (non Poiret). *Scirpus humilis*, Wallroth, Sched. Crit. 27 (1822). *Scirpus translucens*, Le Gall. in Lloyd, Flor. Loire (1844). *Limnochloa parvula*, Reichenbach, Flor. Excurs. 78 (1830). *Eleogiton parvula*, Link, Hort. Reg. Berol. Descr. i. 285 (1827). *Eleocharis parvula*, Hooker, Brit. Flor. (ed. 5) 418 (1842). *Bæothryon nanum*, Dietrich, in Willd. Sp. Pl. ed. 2, vol. i. part i. sect. 2, p. 91 (1833). *B. parvulus*, Nees ab Esenb. Gen. Pl. Flor. Germ. ii. n. 17 (1843).

Fig. 'Flora Danica,' xiii.–mmclxi.; Reichenbach, Ic. Flor. Germ. viii.–ccxcix. n. 706; Sturm, 'Deutschlands Flora,' in Abbildungen, 85, fig. 1; Andersson, Cyp. Scand. tab. i. fig. 20.

Descr. Plant very small, growing upon the soft mud in tufts, which are furnished with many fibrous roots at their base, and are connected with each other by white thread-like runners, these last terminating also in little ovate-subulate tubers, which form a kind of hybernaculum or starting-point for future stems. Stems not branched or prostrate, 5 to 8 in each tuft, often barren, 1 to 1½ inch high, roundish, subcompressed, tapering from below upwards, quite smooth, white in

their lower portion, which is buried in the mud, green above, soft and fistular throughout, consisting of 4 or 5 longitudinal tubes divided into narrow cells by numerous transverse partitions, and surrounded at the base by one exceedingly thin, transparent, oblique, close-pressed sheath. Spikes yellowish, ovate-oblong, about three times as broad as the top of the stem, with 1 thickly-ribbed empty glume at the base and about 5 membranous, green-nerved, fertile glumes above. Stamens 3, very large for the size of the plant. Stigmas 3. Nut quite smooth, obovate-trigonous, tipped by the permanent base of the style and surrounded by 3 (or, as foreign writers say, from 4 to 6) rough bristles.

Hab. On soft mud overflowed at high tide, in salt-marsh creeks at the mouth of the river Ovoca, coast of Wicklow, Ireland, *A. G. More* (July, 1868).—Perennial. Flowers in August.

Scirpus parvulus was first published as a British plant in the 'Catalogue of the Botanical Society of Edinburgh' (1841) and in the fifth edition of the 'British Flora' (1842), having been discovered by the Rev. George Edwards Smith, who in 1837 collected specimens on a mud flat near Lymington, in Hampshire, but on a subsequent visit was unable to find the plant again; nor have any other botanists succeeded, though the very spot has been carefully and often searched by many of our best explorers, especially by the late Dr. Bromfield. Hence *Scirpus parvulus* has come to be considered extinct in England, and has been placed in brackets in the 'British Flora,' and excluded from the 'Cybele Britannica' and 'London Catalogue.'

In the three last editions of the 'British Flora' occurs the remark that *Scirpus parvulus* "is in habit most related to *Isolepis fluitans*, of which some consider it a dwarf variety." I have not been able to discover whose opinion is here quoted, for in all the foreign books which I have consulted I have not once met with the suggestion; though it is true that Sprengel, in his 'Mantissa' (1807), did at first refer *S. parvulus* to *S. fluitans*,—a mistake afterwards corrected by himself in the 'Pugillus,' where our plant was described under the name of *S. nanus*. It will be seen that the authors of the 'British Flora' place one plant as a true *Scirpus*, and the other in the section *Isolepis*; and their habit and characters are so different that I cannot imagine any experienced botanist hesitating to accept *S. parvulus* as now a species, whatever may have been its primeval ancestry.

On the European continent, *Scirpus parvulus* occurs in several scattered localities—on the shores of the Baltic and German Ocean, and on the Atlantic and Mediterranean coasts of France, extending to Sardinia and Italy; but though its range is wide, it appears to be a very local and rare species. Godet, in his 'Flore du Jura,' mentions a locality on one of the lakes; but as Godet compares his plant to *Scirpus pauciflorus*, and as all the other stations are upon the coast or along tidal estuaries, it would appear safer to consider this inland habitat as uncertain for the present. It may well be expected that *S. parvulus* will be found in other parts of Britain; for instance, in some of the muddy estuaries along the mouth of the Thames, in Poole harbour, and other places in the south and south-west coasts of England, and in the south of Ireland. I presume that Mr. Watson would treat it as a member of his "Atlantic type" among British plants.

I have not succeeded in finding ripe fruit on the Irish plant, which appears to propagate itself by means of the little tubers.

Glasnevin, October 10, 1868.

Explanation of Plate LXXXV., representing *Scirpus parvulus*, Rœm. and Schult., from specimens communicated by A. G. More, Esq.—Fig. 1. A group of plants, *natural size*. 2. The same, somewhat *magnified*. 3. Spike. 4. Back view of a single glume. 5. Front view, with the contained flower. 6. Unripe nut with the bristles. 7. Ripe nut. 8. Leaf, showing the cellular structure and the sheath. 9. Transverse section of the leaf. Figs. 2–9, all more or less highly *magnified*.

FRESH EXPLORATION OF THE CALISAYA-YIELDING DISTRICTS OF EASTERN BOLIVIA, BY SENOR PEDRO RADA.

By J. E. Howard, Esq., F.L.S.

The European market has hitherto been supplied with the precious quinine-yielding barks of Bolivia, solely by the ports on the western coast of South America. Arica, Iquique, and others which have suffered in the late calamitous earthquake, were the terminal points to which the *serons* (or packages of bark covered with the hides of oxen) were brought after a long, expensive, and difficult overland journey, over roads too often abandoned to neglect by the administrators of Bolivian affairs. The result was, that on the eastern side of the country, and, consequently, that furthest from the sea, large tracts of

the mountainous regions, although producing these valuable objects of export to perfection, remained practically of no value to the State, because it was supposed to be quite impossible to find an outlet for this commerce down the course of the rivers which eventually join the Amazon, and thus reach the sea on the eastern side of the continent.

I am glad to say that a new era has now commenced for the commerce of Bolivia in this respect, since the enterprise of one of her sons has shown that the difficulties of this eastern route, though sufficiently formidable, can be vanquished by skill and perseverance.

Señor Pedro Rada has recently brought, by way of Pará and Liverpool, a cargo of bark, which was sold in the London market on the first of this present month, October, 1868. The following is a translation of the account given me in Spanish by this gentleman of his voyage:—

"The barks (*Quinas*) which I have brought were cut by my orders near the confluence of the rivers Bopi and Beni, a place where are found the missions named Moschenos, which belong to the department of La Paz, a province of Yungas, in the republic of Bolivia. At the point I have named, the river Bopi loses its name and preserves that of the river Beni, until its union with the Mamore in the sixth rapid, which is called Madera, from whence this river takes its name. I could not descend the whole course of the river Beni, because it is unknown as far as the mission of Cavinas, and on account of the many barbarous and savage Indians that are found there. It was, therefore, necessary that I should travel overland about sixty miles to the new mission of San Buenaventura, a place known by the name of Rurenabaque, by the town (*pueblo*) of Reyes to the river Yacuma. I embarked at the port of San Cristobal, and descended the Yacuma as far as its incorporation with the Mamore, in the vicinity of Santa Anna. Continuing my course down this stream, the Mamore, I reached the junction of the Itenez, or Guapore, and, subsequently, its union with the Beni in the rapid of Madera. Both rivers here lose their names, and take that of Rio Madera, until its union with the Amazons some twenty-four miles above the town of Serpa in the kingdom of Brazil.

"I continued my voyage down the river Amazons until it disembogued in the sea, a little below the city of Belem, on the Pará. There I embarked in the steamboat 'Augustino' of Liverpool.

Touching at the ports of Marañon and of Scarra, I came with my barks to Liverpool.

"To accomplish this voyage, I set off from the city of La Paz for the province of Caupolican, and went by land, and over the very worst roads, more than 600 miles to Rurenabaque. There I gave orders to construct canoes, and went up the river Beni for 200 miles as far as its confluence with the Bopi, a place where the ancient town of Magdalena was situated, from whence I ascended the *montaña* from which the *Quina* was taken.

"I have been compelled to navigate in the following vessels:—From the point of union of the Bopi with the Beni unto Rurenabaque in canoes which only carry four or five quintals. From the point of Rurenabaque to the Yacuma in long waggons, drawn by oxen. From the port of San Cristobal, on the Yacuma, to the town of Exaltacion, on the Mamore, in canoes which carry 25 quintals; from Exaltacion to Serpa, in vessels (*gariteas*) which carry from 50 to 80 quintals; from Serpa to the city of Belem, on the Pará, in the steamboat 'Belem,' belonging to Brazil.

"All this immense journey, full of perils on the different rivers, including nineteen rapids of the Madera, as also through the barbarous or savage Indians that are met with on them,—all this I have accomplished in company with my wife, whose name is Melchore Ney, and with whom you are already acquainted."

Señor Rada refers to my having had the pleasure of entertaining these enterprising voyagers, and showing them my collection of living Cinchona plants, which seemed to afford them much gratification. This was more especially the case, since they were able at once to recognize the plants producing the sort of bark over which so much labour had been expended. My plants were originally derived, first, from seeds collected by Mr. Ledger, from the district of Caupolican (or Apolobamba); secondly, the *Calisaya verde*, raised from seed procured by Mr. Forbes in Larecaja; in the third place, plants raised from seed given me by Mr. M'Ivor, from Ootacamund.

Señor Rada had the goodness to present me with specimens of the leaves of the two sorts which had specially been the objects of his attention, and which he calls the "*morada*" and the "*negrilla*," both terms derived from the purple hue, more or less dark, of the under side of the leaves,—a colour with which the flowers harmonize, whilst the flower of the *verde* is white.

The specimens of bark which he also gave me agree with those of the *morada* and the *zamba* (or *negra*) and *zambita* (or *negrilla*), which I owe to Dr. Weddell's kindness, and which were collected in his *last* journey in Bolivia.

We have thus some reliable information as to these particular undescribed forms of the Cinchona, which promise much interest in a botanical point of view, and which, moreover, from the great delicacy and beauty of the plants, would well repay cultivation even on this ground alone.

Whatever may be the decision of botanists as to the specific names to be attached to these forms, I have only to remark at present that they differ very widely indeed from the Calisaya already cultivated in Java, which has yielded results by no means satisfactory.

These two sorts, on the other hand, produce Calisaya bark of a peculiar sort, but of excellent quality, as may be inferred from the fact that the bark brought by Señor Rada obtained at public auction prices varying from 10 to 25 per cent. above the ordinary run of the best Bolivian bark. This was in part owing to the care that had been taken in their collection, and their consequent freedom from injurious admixtures, as also to their being the first cuttings from an unexhausted district. The pieces of flat bark (*tabla*) reached the size of about two feet six inches in length by six inches in width, and about a quarter of an inch in thickness. The quills (*canutos*) were proportionally large and fine, and, though possessing a character of their own, were scarcely to be distinguished from Calisaya, and as such they were sold.

In a future number, I hope to give the results of the further botanical investigation of the species of which specimens have been sent by Señor Rada.

NOTES RESPECTING SOME PLYMOUTH PLANTS.

By T. R. Archer Briggs.

Reseda lutea, L.—This is rare about Plymouth, and within the bounds of Cornwall I have seen it in only one place, a bank near Trerule-foot toll-gate, between Polbathick and Menheniot, and there I found only one plant in May last, but there were more in 1864.

Geranium rotundifolium, L.—Two unrecorded Cornish stations for

this species are a hedgebank by the lane leading from Penter's Cross to Landulph; a bank at Weard, near Saltash, where it appears with its ally, *Erodium moschatum*, Sm.

Ulex Gallii, Planch.—The common "Dwarf Furze" of the neighbourhood of Plymouth is this, and it is questionable whether we have *U. nanus* or not. *U. Gallii*, Planch., grows plentifully on Roborough and Wigvor Downs, in waste open spots in the valley of the Plym, etc. In Cornwall it is in profusion on Viverdon Down, is common on the cliffs above Whitsand Bay, etc.

Pyrus scandica, Bab.—Five or six bushes, one of which produced fruit this season, may be seen in an old hedgerow near a house by Wigvor Down; a single one in a hedge by the road leading from Tamerton Foliott to Maristowe; and another, in a similar situation, between the former place and Roborough village. This last has been rendered very stunted by having had its young branches cut away whenever the hedgerow has been pared. *P. aria*, Sm., is never seen in hedgerows about Plymouth, and cannot be regarded as even a "denizen" here, which we must, I think, consider *P. scandica* to be, if not more than this.

Epilobium lanceolatum, Seb.—To the Cornish stations already recorded for this species may be added St. German's and Liskeard.

Physospermum Cornubiense, De Cand.—Since my notice respecting this plant appeared in the 'Journal of Botany' for July last, I have discovered that it grows plentifully in two hilly pastures within a mile higher up the valley than the station there given, and extends over a space of, I should say, at least two acres. Here it was in sufficient profusion two months ago to whiten part of the hillside with its flowers. The soil in which it grows is so shallow that here and there portions of rock protrude. Increasing cultivation may soon eradicate it at my former station; but the hilly ground and poor soil of this offer so little temptation to the agriculturist, that it is more likely to be spared here.

Plantago media, L.—Very rare about Plymouth. Eight plants, in an apparently old pasture, at St. John's, near Torpoint, Cornwall, September, 1868. It has only one other local station, Cattedown, which place is in Devon.

Neottia Nidus-avis, Rich.—Rare. Eight plants, in a wood, at Torr, near Yealmpton, June, 1868.

Orchis conopsea, L.—This is rare near Plymouth, and seems to be very uncommon in Devon generally. It was not known to the authors of the 'Flora Devoniensis' as a plant of the county. In June last I noticed about a dozen specimens growing in an elevated part of Cann Plantation, where the Scotch Firs were not thick enough to cause dense shade, and at least treble that number in a heathy piece of ground on the other side of the stream below the plantation. I have already recorded it from Roborough Down, where it still grows.

Habenaria bifolia, Br.—Several plants in the heathy piece of ground that produced the last species. *H. chlorantha*, Bab., is rather common about Plymouth, but *H. bifolia* is rare.

On two or three occasions during the past summer I have thought it worth while to look for *Arabis petræa*, Lam., on Wigvor Down, as this place is given as a station for it in the 'Flora Devoniensis' (on the authority of Hudson and a Sir Francis Drake) in the following words:—"Wigvor Down, near Meavy, between the gully and the gate leading to Greenvil Farm." I found the gully, gate, and farm, but not the *Arabis*.

4, *Portland Villas, Plymouth; September* 17, 1868.

SERTULUM CHINENSE TERTIUM: A THIRD DECADE OF NEW CHINESE PLANTS.

By H. F. Hance, Ph.D., etc.

1. *Xylosma senticosum*, n. sp.; suffrutescens, humile, dumosum, caule cortice albido obducto, ramulis castaneis tomentellis, foliis brevissime petiolatis glaberrimis supra nitidulis subtus pallidioribus exacte ovatis 6–8 lin. longis acutiusculis margine revolutis parce incumbenti-serratis serraturis obtusis glandulosis, spinis axillaribus rectis gracile acicularibus foliis dimidio brevioribus vel iis nunc æquilongis, racemis masculis 5–7-floris foliis brevioribus, bracteis oblongis obtusis subcucullatis, sepalis rotundatis margine ciliato excepto glaberrimis symptyxi decussatim oppositis, staminibus circ. 20.—Juxta viam ad summitatem montis Victoriæ ins. Hongkong ducentem, semel tantum inveni, m. Augusto 1861 (Exsicc. n. 7437).

Mr. Bentham, to whom at the time of its discovery I communicated

a portion of the only specimen I ever obtained of this interesting plant, examined it himself, and suggested its probable genus, an opinion the accuracy of which the character above given will confirm; he added, however, that the flowers are "apparently hermaphrodite," which is not the case. Although the female flowers are not known, it is probably a true *Xylosma* rather than a *Hisingera*, and I suspect its nearest relationship is with *X. suaveolens*, Forst., A. Gray's plate of which I have not seen. The leaves are much smaller than in any of the species described by Clos.

2. *Abelia Davidii*, n. sp.; frutex ramis oppositis subteretibus cortice cinereo nigro-punctato obductis novellis pallide brunneis albo-strigosis ad ramulorum foliorumque insertionem perularum reliquiis nodoso-incrassatis, foliis lanceolato-oblongis acutis margine integerrimo ciliatis 2–2¾ poll. longis 2–10 lin. latis basi in petiolum bilinealem attenuatis costa utrinque strigosa supra pilis raris brevibus obsitis subtus glabris atque grosse reticulato-venosis, floribus geminis ramulos hornos terminantibus, pedicellis 2½-linealibus angulatis tortuosis recurvis corollis? (in spec. delapsis), achæniis incurvis cymbiformibus longitudinaliter circ. 5-costatis pilis sparsis basi tuberculatis consitis 3 lineas longis laciniis calycis 4-partiti oblongis obtusis uninerviis atque reticulatis præter marginem parce strigilloso-ciliatum glaberrimis ipso achænio subduplo longioribus coronatis ob pedicellorum retorsionem pendulis.—In montibus altioribus prope Jehol, prov. Chih-li Chinæ septentrionalis, collegit Rev. Armandus David, Franco-gallus, missionarius e Lazaristarum confraternitate. (Exsicc. n. 14543.)

This appears a perfectly distinct species of a genus the members of which are in general very well marked by the inflorescence and the number and form of the calyx-lobes. (See, however, Miquel's remarks Ann. Mus. Lugd.-Bat. ii. 268.) So far as I am aware, the only species hitherto described as having a quadrifid calyx is *A. biflora*, Turcz., only known to me from the very meagre and insufficient diagnosis copied into Walpers' Repertorium (ii. 446), where, I suppose by oversight, the *corolla* is so described, an error corrected by Zuccarini (Fl. Japon. i. 77). This species is, however, stated to have lanceolate inciso-serrate leaves.

3. *Symplocos (Hopea) propinqua*, n. sp.; frutex 6–8-pedalis, foliis coriaceis glaberrimis ovali-oblongis margine revolutis et obsolete denticulatis apice obtusis basi cuneatis venis subtus prominulis 2–4 poll.

longis 1–1½ poll. latis petiolo 3-lineali suffultis, racemis axillaribus simplicibus vel ramosis pilis ferrugineis glandulosis dense velutinis foliis subæqualibus vel dimidio brevioribus, pedicellis velutinis 1½–2½-linealibus, bracteis velutinis ovato-rotundatis caducis, calycis tubo obconico lobis rotundatis oculo armato minutissime ciliolatis.—In colli quodam demisso herbido prope monasterium buddhisticum ad boream urbis Shui-tung, in extremitate prov. Cantoniensis australi, d. 15 Nov. 1866, collegerunt Sampson et Hance. (Exsicc. n. 13796.)

Very closely allied to *S. obtusa*, Wall., from which it is only to be distinguished by the rather less coriaceous leaves, with less prominent veins, and by the velvety, frequently compound racemes. In the various forms assumed by *S. obtusa* in Ceylon, the racemes are, I believe, always perfectly smooth.

4. *Cynoctonum insulanum*, n. sp.; herbaceum, volubile, glaberrimum, foliis e basi truncata vel subcordata hastato- vel subtriangulato-lanceolatis vel lanceolatis (lobis nempe basilaribus obsoletis) apiculatis petiolo lamina duplo breviore supra pilosulo suffultis, umbellis 6–12-floris pedunculo petiolo æquilongo suffultis, calycis laciniis ovatis, petalis oblongis obtusiusculis corona staminea tenui alba æqualiter 10-fida acutiuscula paulo longioribus.—In ins. Hai-nan Martio 1868 collegit clar. R. Swinhoe. (Exsicc. n. 14413.)

This plant resembles in foliage *Symphyoglossum hastatum*, Turcz., but the basal lobes are less developed; the flowers too are twice as small. I had regarded it as a *Cynanchum* (with R. Brown's and Grenier and Godron's character of which it agrees); the staminal corona, however, is tubular and 10-cleft, with the divisions in a single row, so that it does not fall into that genus, as limited by Decaisne. It is perhaps near *Cynoctonum angustifolium*, Dcne., but I have no critical knowledge of the species.

5. *Tournefortia (Pittonia) Sampsoni*, n. sp.; erecta, ramulis angulatis hispidulis, foliis breve petiolatis oblongo-lanceolatis obtusiuscule acuminatis supra parcissime hirtellis subtus paulo densius hispidis mox utrinque glabratis, pedunculis terminalibus ebracteatis dichotomis hispidis, floribus sessilibus congestis, calycis hispiduli 5-partiti lobis lanceolatis acutis, corolla alba hirtella calyce quinquies longiore lobis brevibus rotundatis retusis, staminibus infra medium tubum insertis, stigmate sessili bilobo. Folia 4½–6½ poll. longa, incl. petiolo semipollicari, 1½ poll. lata. Calyx 1 lin. Corolla 5 lin.—In umbrosis inter

rupes porphyriticas ad ingentes cavernas naturales Sai-chii-shan, prov. Cantoniensis, invenit Th. Sampson, Aprili, 1866. (Exsicc. n. 13035.)

Allied to *T. Bojeri*, A. De Cand., and *T. Heyneana*, Wall. It differs from the latter by the tube of its longer corolla not being pentagonal, by the shape of the laciniæ, by its sessile bilobed stigma, etc. The whole plant turns of an ash-grey hue in drying.

6. *Calamintha (Clinopodium) confinis*, n. sp.; herbacea, diffusa, basi radicans, glabra vel parce pubescens, foliis teneris rhombeis obtusis basi in petiolum limbo æquilongum cuneatis supra medium crenato-serratis, verticillastris densiusculis subglobosis multifloris, bracteis minutis, calyce bilineali pedicello bis longiore tubo basi æquali glaberrimo fauce intus pilosula dentibus brevibus rectiusculis pectinato-ciliatis, corolla rosea leviter tantum exserta.—Ad Sai-chii-shan, prov. Cantoniensis, leg. T. Sampson, m. Aprili, 1866. (Exsicc. n. 13045.)

Holds a middle place between *C. gracilis*, Benth., and *C. umbrosa*, Benth. I have endeavoured, in the Paris ‘Annales des Sciences Naturelles’ (5me. sér. v. p. 235), to point out the salient characteristics of several of the different *Clinopodia*, which some recent authors have, in my judgment, shown an undue tendency to combine.

7. *Solanum Hainanense*, n. sp.; fruticosum, diffusum, ramis elevato-pluristriatis junioribus stellato-pilosulis maturis glabratis subscabrido-punctulatis, aculeis rectiusculis, foliis deltoideis integris repandis vel utrinque 1–3-lobulatis obtusis basi cuneatis parce in costa aculeatis supra viridibus parce stellato-pilosis demum glabratis subtus tomento denso-stellato cinereo obductis, pedunculis lateralibus v. terminalibus 1–3-nis cum calycibus cyathimorphis 5-dentatis stellato-tomentosis inermibus, corollæ 5-partitæ laciniis lanceolatis acutis calyce triplo longioribus extus passim intus secus nervum medium stellato-pilosis, filamentis brevissimis, antheris æqualibus apice attenuatis petalis paululum brevioribus stylum subæquantibus, baccis globosis pisi magnitudine rubris calyce reflexo suffultis.—Ad vias prope Kieng-chau-fú, metropolin insulæ Hai-nan, m. Novembri, 1866, legerunt Sampson et Hance. (Exsicc. n. 13816.)

Allied, unless I am mistaken, to *S. hastifolium*, Hochst.! from Kordofan.

8. *Buxus stenophylla*, n. sp.; suffrutescens, ramis erectis confertis cortice crasso albo-cinerascente suberoso fungoso-fisso obtectis, foliis sessilibus oblongo-lanceolatis basi sensim angustatis apice acutiusculis

marginibus incrassatis recurvis glaberrimis supra lucidis venis tenuissimis parum elevatis subtus opacis 6–8 lineas longis $1\frac{1}{4}$–2 lineas latis, floribus dense glomeratis, staminibus calycem paulo superantibus.—In collibus theiferis An-koe, versus fines occidentales prov. Fokien, a. 1861 coll. C. de Grijs. (Exsicc. n. 6683.)

On receiving this I distributed it to Kew and elsewhere, with a query, as *B. microphylla*, S. and Z.; it is, however, different from the Japanese plant so named by Maximowicz, and I believe has narrower and smaller leaves than any known *wild* Box. Baillon, who gives scarcely reliable characters, admits *B. microphylla* as a good species (Monogr. des Buxées, p. 64), whilst J. Mueller, according to Miquel (Ann. Mus. Lugd. Bat. vol. iii. p. 128), regards it as a variety of *B. Japonica*, Muell. Arg., under which name he separates the *B. sempervirens*, Thunb., from the plant of Linnæus, with wild specimens of which, from the chain of the Atlas, it looks to me identical. I believe, however, that the wild Hongkong plant (*B. Chinensis*, Link?), as well as that above described, are of specific rank. It is to be hoped that, in his forthcoming monograph, M. Mueller will succeed in characterizing and limiting the species in a more satisfactory manner than has hitherto been accomplished.

9. *Ulmus (Oreoptelea) macrocarpa*, n. sp.; ramorum cortice griseo, foliis petiolo brevi supra pubente suffultis $1\frac{1}{2}$–$1\frac{3}{4}$ poll. longis $1\frac{1}{4}$ poll. latis basi subinæquali cuneata vel subcordata rhomboideo-subrotundis acuminatis grosse inæqualiter duplicato-serratis marginibus incrassatis supra punctis* albidis asperis consitis subtus parcius pilosulis atque in costularum axillis barbatis, floribus 5–9 fasciculatis, pedicellis perigonio duplo brevioribus, perigonii campanulati ad medium fere 5-fidi lobis oblongis obtusissimis haud imbricantibus pilosis ferrugineo-ciliatis, staminibus longius exsertis, samaræ ovalis vel ovali-oblongæ basi plerumque inæquilateræ undique pilosæ ac dense ciliatæ pollicem longæ 9 lineas latæ disco semiintegro emarginaturæ alæ apicibus conniventibus vel decussatis occlusæ fundo contiguo, stipite perigonio æquilongo.—In montosis prope Jehol, Chinæ borealis, Maio fructificantem legit Rev. A. David. (Exsicc. n. 14538.)

Closely allied to *U. pedunculata*, Foug., *U. Americana*, Willd., and

* Hæcce tubercula, a Plancone (Ann. Sc. Nat. 3me sér. 10. p. 249) pro pilorum basibus habita, cum *cystolithis* Urticacearum typicarum ulterius comparanda sunt.

U. alata, Mx., but very distinct as a species, and well marked by its fewer-flowered fascicles, short pedicels, and the large size of its hairy fruit, somewhat exceeding that of the Indian *U. (Holoptelea) integrifolia*, Roxb.

10. *Planera (Abelicea) Davidii*, n. sp.; ramis flexuosis lentis (nec fragilibus) cortice brunneo obductis, ramulis floriferis hornis ad latera præteritorum aphyllorum (cujus alter abortu plerumque abbreviatus ad spinam validam deminuitur) 2–3-fasciculatis pilis crispulis pubentibus, foliis petiolo $\frac{1}{2}$–$\frac{3}{4}$ lin. supra piloso suffultis oblongis basi subcordatis apice acutis serratis serraturis more *Agrimoniarum* basi incumbentibus utrinque 8–11 singulis costulam excipientibus undique (novellis etiam immo lente adhibita) glaberrimis supra plus minus conspicue ac sæpe nigricanti-punctatis subtus pallidioribus 4–10 lineas longis 2–4 lin. latis, stipulis subscariosis lanceolatis puberulis deciduis petiolos duplo superantibus, floribus (♂ non visis) fertilibus per totam longitudinem ramulorum dispositis axillaribus 1–4-nis pedicellis angulatis glabris iis æquilongis suffultis, perigonii rugosi glabri lobis 4 obtusissimis ciliatis, disco nullo, staminibus perigonio duplo longioribus antheris magnis basi apiceque locellorum disjunctione emarginatis, achæniis (juvenilibus bilinealibus tantum visis) sessilibus dimidiato-ovatis tenuiter rugulosis haud nervosis stigmatibus binis papillosis oblique coronatis.—In montosis ditionis Pekinensis necnon circa Jehol, unde specimina paulo maturatiora, m. Maio coll. R. P. David, missionarius apostolicus. (Exsicc. n. 14575.)

This very interesting species differs from *P. Richardi*, Mx., and from Miquel's recently described *P. Japonica* by the pedicelled usually fasciculate ☿ flowers, situated in the leaf-axils along the entire length of the branchlets, and destitute of a disk; and thus strengthens Planchon's view that Spach's *Zelkova* cannot be separated generically from *Planera*. I trust M. David may get ripe fruit, which would possibly afford other characters. There is a noteworthy parallelism between the geographical distribution of this genus and *Liquidambar*, the respective species of each being natives, of the area extending between the Caspian, Black and Mediterranean Seas, of the continent of North America, and of the extreme east of Asia and Japan.

NEW AND RARE BRITISH FUNGI.

[We are indebted to our correspondent Mr. W. G. Smith for the following list of the more interesting species of Fungi amongst those exhibited at the meeting of the Royal Horticultural Society, or collected by the Woolhope Club, referred to in another page of this Journal.]

Agaricus (Amanita) muscarius, L. This species is usually crimson; a brilliant and pure yellow variety was exhibited.

A. (Lepiota) holosericeus, Fr. A single specimen from Staplehurst, Kent, of this species, which has but once before been observed in this country.

A. (Lepiota) excoriatus, Schæf.

A. (Tricholoma) nictitans, Fr., and *A. (Clitocybe) geotropus*. Both sent by J. R. Reeves, Esq., F.R.S.

A. (Tricholoma) cartilagineus, Bull., and *A. (Tricholoma) sulfureus*, Bull. Both in Dr. Bull's collection.

A. (Pleurotus) subpalmatus, Fr., *Lentinus vulpinus*, Fr., and *Boletus impolitus*, Fr. Sent by Mr. W. G. Smith.

Polyporus giganteus, Fr., and *P. radiatus*, Fr. Exhibited by Dr. Bull.

Mr. J. Aubrey Clark, of Street, Somerset, sent two species of *Hydnum* of great interest; one, *H. zonatum*, Fr., a rare fungus, and the other, *H. nigrum*, Fr., a species quite new to this country, a figure of which, with some other new hymenomycetous fungi, we hope to give in a future number.

Dr. Bull also had specimens of *Scleroderma Bovista*, Fr. Mr. Reeves exhibited an *Elaphomyces*, with the parasite, *Cordiceps ophioglossoides*, Fr., in the process of development; and Lady Dorothy Nevill forwarded the base of a Hazel stem obtained from Rome, where it is used, after being charred, for producing *Polyporus corylinus*, Mauri.

It may be added as somewhat curious that *Agaricus rubescens*, P., and *Boletus edulis*, Bull., two of our best known edible species, were not represented.

A. (Tricholoma) sculpturatus, Fr. Common in the woods round the Wrekin, Shropshire.

Lactarius torminosus, Fr. Common in Holme Lacy Park.

Coprinus picaceus, Fr. One specimen in Holme Lacy Park.

Hygrophorus calyptræformis, B. and Br. Plentiful in Holme Lacy Park.

Strobilomyces strobilaceus, Berk. Two specimens in Haywood Forest.

Cynophallus caninus, Fr. One specimen in the woods round the Wrekin, Shropshire.

ON THE EARLY SPRING-FLOWERING SPECIES OF SCILLA, *Linn.*

By M. T. Masters, M.D., F.L.S.

[The following descriptive account of some of the greatest ornaments of our gardens in early spring, is taken from the pages of the 'Gardeners' Chronicle.' Only those species and varieties are mentioned which are of greatest horticultural interest,—precisely those, as often happens, which are most involved as to their synonymy.]

1. Scilla bifolia, *Linn.; Bot. Mag. t.* 746; *Kunth, Enum.* iv. 316; *Redouté, Lil. t.* 254.—Bulb ovoid. Leaves 2–3, spreading, recurved, linear lance-shaped, channelled, terminating in a short, blunt, cylindrical point. Scape or common flower-stalk as long as or longer than the leaves. Bracts minute. Pedicels spreading, lower ones longer than the upper ones. Flowers 5–6, blue. Segments of the perianth oblong, obtuse, spreading.

We take this to be the type, the nearest to the wild form, intended by Linnæus and the older writers. There are in gardens several varieties of it, differing in the size and colour of their flowers, in the period of their blooming, etc. It is a matter of opinion whether or no these should be considered as species. For our own part, we consider them as varieties of one species, for three reasons. First, that they all have certain characters in common, characters of too slight moment to be of value as generic distinctions, but available for specific purposes. Among them we may mention, as easily appreciable, the blunt cylindrical point of the leaf. Other species have a blunt thickened point to the leaf, but none have it so well marked as *S. bifolia*, wherein it is sometimes a quarter of an inch in length. All the varieties have this character. Next, the several varieties run one into the other, so that, in the dried condition at

least, it is not possible always to discriminate them. Thirdly, the extensive geographical range of the plant in a wild state (from Russia to Greece) would lead us to expect numerous variations. There are other reasons of a technical nature which would induce us to consider these as all forms of one variable species,—reasons which it is needless to enter into here, the more so as if any one incline to adopt the opposite opinion, there is nothing to prevent him from so doing. We take first that variety, the flowers of which expand the earliest, and to which, therefore, the name *præcox* is well applied.

a. *Scilla bifolia*, var. *præcox*. — S. præcox, *Willd. ex Kunth, Enum.* iv. p. 316; *Sweet, Brit. Flower Garden*, v. *t.* 141 (?); *Schott, Bot. Zeit.* 1851. S. bifolia major, *Hort. Osborn.*

This differs from the type, as before stated, in its earlier expansion; about London last spring it was in bloom a fortnight earlier than the true *S. bifolia*. It has larger flowers of a deeper blue colour than in the last-named, and the lower flower-stalks are after a time so much lengthened as to form a corymb. Too much stress must not, however, be laid on this character, as all the varieties of *S. bifolia* more or less possess it. There are specimens in the Kew herbarium from Pallas, collected probably in the Caucasus. No name is attached to the specimen, but there is a memorandum in M. Planchon's handwriting, "Scillæ bifoliæ proxima." The plant is not very common in gardens. We have had it ourselves in cultivation for a few years, having received it under the name of *S. bifolia*. There is a white-flowered form of this plant in some gardens.

b. *Scilla bifolia*, var. *carnea*, Kunth, Enum. iv. 316; Bot. Mag. t. 746.

This resembles the type in all respects, save that its flowers are of a pale flesh-coloured tint. It seems to be the *Hyacinthus stellatus flore rubente* of Parkinson, who thus speaks of it:—"The difference in this from the former (*S. bifolia*) is onely in the flowers, which are of a faire blush colour, much more eminent then in the others, in all things else alike."

c. *Scilla bifolia*, var. *rosea*.—S. rosea, *Lehmann, Index Sem.* 1828; *Linnæa*, v. 384; *Kunth, Enum.* iv. 317. S. bifolia, *var.* γ. Taurica, *Regel, Gartenflora*, 1860, t. 307 (?).

This differs from the preceding in the larger size of the flowers, and in the more globose form of the bulb. This last character, however, is

not to be depended on. This plant may be the plant spoken of by Parkinson as "*Hyacinthus stellatus præcox flore suave rubente*, the early blush-coloured starry Jacinth," which, he continues, "is very rare, but very pleasant, his flowers being as large as the first of this last kinde (that above alluded to as *S. bifolia, præcox*), and somewhat larger than the blush of the other kinde (*S. bifolia, carnea*); the leaves and rootes differ not from the last-recited Jacinth." We believe Regel's var. *Taurica* is the same plant with blue flowers, but have had no means of confirming or refuting this opinion.

d. *Scilla bifolia*, var. *alba*, Kunth, Enum. iv. 316.

Differs from the type only in its white flowers. Parkinson says of this:—"The buddes for flowers at the first appeare a little blush, which when they are blowne are white, but yet retaine in them a small shew of that blush colour." He goes on to say:—"We have another whose flowers are pure white, and smaller than the other, the leaves whereof are of a pale fresh greene, and somewhat narrower." This latter is the commoner variation of the two.

e. *Scilla bifolia*, var. *candida*.

We propose this name for a pure white-flowered variety, the flowers of which are as large as those of our *S. bifolia, præcox*, or of the var. *rosea*, of which indeed it might be considered as the white-flowered representative, but that it flowers later. It is perhaps the *H. stellatus præcox flore albo* of Parkinson.

2. Scilla Sibirica, *Andr. Bot. Rep. t.* 365 (1804); *Kunth, Enum.* iv. *p.* 318; *Van Houtte, Flore des Serres*, xvi. *t.* 1677. S. amœna, *Redouté, Lil. t.* 130. S. amœna, β. Sibirica, *Bot. Mag.* 1025 (1807); S. cernua, *Redouté, Lil. adnot. ad fol.* 298, *nec tab.* (1809); *nec Hoffm. et Link; Regel, 'Gartenflora,'* 1865, *p.* 322, *t.* 488. S. azurea, *Goldb. ex Kunth, l. c.* S. uniflora, *Willd. Herb.* S. præcox, *Donn, Hort. Cantab. (?) nec Willd.*—Bulb roundish, the size of a chestnut, with a dark rind, giving off four or more erect, or somewhat spreading, flat, strap-shaped leaves, slightly thickened at the point; common flower-stalks one or two, flattened, striated, scarcely so long as the leaves. Flowers 2–4 or even 6, rarely solitary, on short stalks, horizontal or nodding, bell-shaped, ultimately spreading widely, of a pale clear blue colour, rather more intense along the central nerves of each segment of the perianth.

The list of synonyms will show the confusion that has reigned as

to this beautiful species. Part of this confusion is due to Redouté, who, in 1807, figured our present plant as *S. amœna*, but after a time (in 1809), finding that he was in error, he named it *S. cernua*. He does not seem to have been aware that Andrews had in 1804 already figured and described the plant as *S. Sibirica*. This latter name, then, clearly has priority. It flowers a little later than *S. bifolia*, but before *S. amœna*. Some doubts have been entertained as to the correctness of the name *S. Sibirica*, it having been stated that the plant does not occur in Siberia. Whether this be so or not we cannot determine, but we have seen specimens gathered by Pallas near the river Volga, but in what part of its course is not stated. At any rate, the head-quarters of the species would appear to be in Persia, Asia Minor, about Erzeroum, etc. Varieties with larger flowers than ordinary, and others with solitary blossoms, are represented in herbaria, and we have seen similar illustrations in British gardens; but they are so similar in all other respects to the type that no one can look upon them as any other than trifling variations.

a. Scilla Sibirica, var. *amœnula.*—S. amœnula, *Bot. Mag. t.* 2408.

To this form we refer some plants which are smaller than *S. Sibirica*, with more ovate bulbs and paler flowers. But that the plant is well figured in the Magazine, and is known in at least a few gardens, we should not have deemed it worth while to retain this as a distinct form.

3. Scilla amœna, *Linn.; Redouté, Lil. t.* 298; *Bot. Mag. t.* 341.—Bulb ovoid or roundish. Leaves numerous, spreading, strap-shaped, acute, 10–12 inches long, ½ inch wide; midrib prominent on the under surface. Scape erect, shorter than the leaves, compressed, two-edged, striated, purplish above. Flowers 3–6, dark indigo-blue, in a loose two-sided cluster, horizontal when expanded. Pedicels erect, curved at the apex, bluish, ½ to ¾ inch long, springing from the axil of a very minute whitish bract. Perianth 6-parted, nearly 1 inch across when expanded; segments spreading horizontally or even reflexed, lanceolate, acute, slightly concave at the apex; midrib prominent, inner segments slightly broader. Filaments dilated and whitish at the base, blue above, one-third shorter than perianth; anthers blue. Ovary pale yellow, oblong; style blue.

A native of Central Europe, the Tyrol, etc., and an old inhabitant of

our gardens. Its flowers are not so nodding as those of the preceding; they are also flatter, not so bell-shaped, and of a darker blue, while the ovary, as Parkinson's sharp eyes detected, is of a yellowish-green colour, thus giving to the flowers the appearance of a yellow centre or "eye." It flowers (in the south of England) in April, following close upon *S. Sibirica*.

The species above mentioned have all this character in common, that the bracts at the base of the pedicels are very minute, whereas in *S. verna*, *S. campanulata*, *S. Italica*, and the later-flowering kinds, the bracts are often as long as the pedicels themselves. These species, moreover, are better known, and their synonyms less confused; hence it is not necessary to allude to them at any further length.

THE EDIBLE TAHITIAN FUNGUS.

My attention has been directed to a paragraph in the 'Journal of Botany,' Vol. V. (1867) p. 263, relative to a Tahitian fungus under the name of "Teria iore," or Rat's-ear, said to be a considerable article of commerce with China. As the botanical name of this species was not given, I have been asked to supply the deficiency. I have no doubt whatsoever that the fungus which was sent in a dried state to the Exhibition of 1862, from China, by way of Singapore, was the same thing. In the Catalogue of the Indian Department of that Exhibition, under n. 1681, p. 73, I referred it to *Hirneola auricula-Judæ*, since I could see no difference between the specimens sent and our indigenous species of "Jew's-ear." Recently going over the "Catalogue des produits des Colonies Françaises envoyés à l'Exposition universelle de Londres de 1862," at p. 109 I find, from Tahiti, "Champignons dits oreilles de rats, *Exidia auricula-Judæ*, Taria éioré," were exhibited. In a note it is stated that this fungus is very common at Tahiti and the neighbouring islands, and is in great esteem in China, to which country it is largely exported. Without hesitation, therefore, I conclude that the fungus alluded to in this Journal was *Exidia*,—or, as now usually written, *Hirneola auricula-Judæ*, Fries.

M. C. Cooke.

LIST OF SAMOAN FERNS,

COLLECTED AND ARRANGED ACCORDING TO HOOKER'S 'SPECIES FILICUM,' BY REV. S. POWELL.

(*Concluded from p.* 319.)

Suborder 8. *Aspidiaceæ*.

Didymochlæna polycarpa, 79.
Aspidium aristatum, *Sw.*, 42.
A. (Sagenia) cicutarium, *Sw.*, 59.
Nephrodium Leuzeanum, *Hook.*, 60.
N. (Eunephrodium) molle, *Desv.*, 78*a*.
N. (E.). Near *molle*, 78.
N. (E.) dissectum, *Baker*, 81.
N. (E.) unitum, *Sieb.*, 43.
N. (E.) pteroides, *Baker*, 115.
N. (E.) truncatum, *Baker*, 77.
N. (E.) decurrens, *Baker*, 89.
N. (E.) subtriphyllum, *Baker*, 46.
N. (Lastræa) calcaratum, *Hook.*, 90.
N. (L.) patens, *Desv.*, 75.
N. (L.) funestum, *Hook.*, 59.
N. (L.) membranifolium, *Pr.*, 59*b*.
N. (L.) tenericaule, *Hook.*, 58.
N. (L.) attenuatum, *Brack.*, 76.
N. (L.) inæquilaterum, n. sp., *Baker*, 114.
N. (L.) davallioides, *Baker*, 88.
N. (L.). Near *davallioides*, 80.
N. (L.). Tree-fern, n. sp., 87.
Nephrolepis (Lastræa) acuta, *Pr.*, 82, 83.*
N. (L.) obliterata, *Brack.*, 28.
N. (L.) tuberosa, *Pr.*, 181.
Oleandra nereiformis, *Cav.*

Suborder 9. *Polypodieæ*.

Polypodium (Eupolypodium) Hookeri, *Brack.*, 96.
P. Samoense, n. sp., *Baker*, 111.

* I cannot believe that 82 and 83 are the same species.

P. cucullatum, *Nees*, 105.
P. blechnoides, *Hook.*, 94.
P. tamariscinum, *Klfs.*, 95.
P., n. sp., near *alte-scandens*, 130.
P. (Goniophlebium) serratifolium, *Brack.*, 124.
P. (Niphobolus) adnascens, *Sw.*, 1.
P. (Phymatodes) accedens, *Bl.*, 93.
P. (P.) nigrescens, *Bl.*, 14.
P. (P.) Powellii, n. sp., *Baker*, 135.
P. (P.) dilatatum, *Wall.*, 55.
P. (Dipteris) Horsfieldii, *Br.*, 113.

Suborder 10. *Grammitideæ.*

Monogramme Junghuhnii, *Hook.*, 11.
Gymnogramme (Eugyma) tartarea, *Desv.*, 21.
G. (Telliguea) lanceolata, *Sw.*, 97.
Antrophyum* semicostatum, *Bl.*, 71.
A. angustatum, *Brack.*, 29.
A. plantagineum, *Klfs.*, *var.*
A. subfalcatum, *Brack.*, 126.
Vittaria (Janiopsis) scolopendrioides, *Baker*, 116.
V. (J.) Zeylanica, *Fée.*
V. (Euvittaria) rigida, *Klfs.*, 12.

Suborder 11. *Acrosticheæ.*

Acrostichum (Elaphoglossum) Feejeense, *Hook.*, 121.
A. (Lomariopsis) sorbifolium, *L.*, 21.
A. (Heteroneuron) repandum, *Bl.*, *var.* palustre, *Baker*, 66.
A. (H.) „ *var.* lonchophorum, *Baker*, 67.
A. (Chrysodium) aureum, *L.*, 69, 70.
A. (C.) Blumeanum, *Hook.*, 26, 68.

Suborder 12. *Danæaceæ.*

Angiopteris evecta, *Hoff.*, 84.

TRIBE 3. LYCOPODIACEÆ.

Selaginella Menziesii, *Spr.*, 8.

* This appears to me more like a *Stenochlæna*.

S. ? Vogelii, n. sp., *Hook.*, 134.
S. ? tenera, n. sp., *Spr.*, 133.
Psilotum triquetrum, *Sw.*, 49.
P. complanatum, *Sw.*, 50.
Lycopodium laxum, *Pr.* 54.
L. cernuum, *L.*, 6.
L. Phlegmaria, *L.*, 9.
L. squarrosum, *Forst.*, 10.

ON VARIOUS SAMOAN PLANTS AND THEIR VERNACULAR NAMES.

By the Rev. Thomas Powell, F.L.S.

(*Continued from page* 285.)

Filitavatio (*Faradaya Powellii*, n. sp. Seem.). A large climbing plant, many yards long, ascending the highest trees, called by some "Mamagi." Stems round, except at the origin of the leaves, where they are flat. Leaves opposite, entire, smooth, ovate-lanceolate, minutely dotted. Flowers in axillary and terminal panicles, sweet scented. Calyx inferior, persistent, crateriform, slightly 4-lobed, regular, coriaceous, green at the base, tube and lobes white. Corolla hypogynous, monopetalous, regular, 4-lobed, white. Æstivation imbricate. Stamens 4, inserted into the tube of the corolla and alternate with its lobes. Filaments curved inwards and downwards in æstivation. Anthers large, 2-lobed, 4-celled, versatile. Ovary seated on a large torus, 4-parted, each part containing an ovule arising from the base of its cavity. Style simple, awl-shaped, longer than the corolla, arising from the middle of the base of the lobes of the ovary. Fruit large, red, fleshy. Drupes oblong, slightly curved. Epicarp fleshy, thin. Mesocarp bony. The pigeons take three or four of these large drupes into their gullet at once; hence they are called "Mamālupe" (the pigeon's mouthful).

Filofiloa (*Coffeacea*). A pretty small tree,—wood very hard, good for tool-handles, mallets, etc.

Fiso (*Saccharum floridulum*, Labill.). The indigenous Sugar-cane,—stems used for the small rafters of the native huts; leaves as thatch, and as food for cattle.

Fīsóā (*Colubrina Asiatica*, Brongn.). Habit twining. Flowers yellow. Leaves used as a substitute for soap. "'U'u fisoa," to be cleansed or anointed with fisoa, is a phrase used in native poetry.

Fúa. The collective name for fruits and seeds.

Fu'afu'a (*Kleinhoovia hospita*, L.). A valuable timber tree, whose wood, when full grown, is very durable for house-carpentering; its flowers are small and reddish; its fruit covered with a membranous lobed capsule, somewhat like the fruit of *Dodonæa*. There are two kinds or rather two states of the wood; the one mature and hard, the other young and soft; the hard is not attacked by the white ants, the other very readily. Fu'afu'a mala, the soft kind. Fu'afu'a fatu (stony), the hard kind.

Fu'apine (*Myrsinea*). A small tree, with exstipulate alternate leaves. Flowers in racemes. Fruit white, fleshy, eaten by the children. The bark dark, studded with light dots. This tree is called on Manua "Lalamea" and "Lalamelo."

Fue. The collective term for a great number of twining or climbing plants; indeed, everything with the habit of a Convolvulus, a *Cucurbitacea*, or Pea is called a "Fue;" often having a distinctive term added, *e. g.* "Fue-asage." See "Asage."

Fue (*Morinda* sp.?). A climbing plant, with a round rough stem, opposite, entire, small, ovate-lanceolate, shining leaves, interpetiolar stipules, and an inferior fruit in a capitulum.

Fueāfága (*Cucurbitacea*).

Fuemaga (*Jasminum* sp.). A neat, pretty-looking creeper, trifoliolated. Corolla sweet-scented, white, monopetalous, 6–8 somewhat irregular lobes, æstivation imbricate. Stamens 2. Stigma flat.

Fuemea. The Waterbine.

Fue-manogi (sweet-scented) (*Jasminum* sp.). With a woody, twining, scandent stem. Flowers white. Lobes of corolla 6, imbricate, twisted at the apex. Stamens 2. Ovules ascending.

Fuesā, Fueselelā (the Sacred Bindweed, the Sun-nooser), referring to the legend recorded in Turner's 'Nineteen Years in Polynesia,' pp. 248–249 (*Hoya* sp.).

There are at least three species of this in Samoa :—

1. Beautiful, roundish-oblong, thick leaves, white and pink-flowered. The true "Fuéselêlā."

2. A yellow-flowered one. Leaves ovate-acuminate.

3. A small-leaved one of the same form.

Fuesina, Fueto (Bindweeds).

Fueuli (*Papilionea*). An intertwining creeper and climber, large, dark leaves, prominent veins.

Fueulufeti'i. The name of another rather remarkable Bindweed.

Fune. The name of the fleshy axis supporting the female flowers of the breadfruit.

Futu (*Barringtonia speciosa*, L.). A large tree, 20–40 feet high, bearing a large quadrangular, 4-sided fruit, which the natives use for stupefying fish in the sea. Leaves alternate, dotless. Calyx 2-lobed, lobes valvate in æstivation, persistent. Petals 4, white. Stamens very large and very numerous, about 300. Filaments connate at the base, white three-fourths of their length, and pink the remainder. Anthers small, yellow. Ovary 4-celled. Ovules several. Fruit 1-celled, inferior.

Gatae (*Erythrina Indica*, Lam.). A prickly tree, with racemes of large, scarlet, papilionaceous flowers; these are called "'Alo'alo," and their appearance is, to the Samoans, the sign of the commencement of spring. In bloom in July and August. Its wood is too soft to be of much use. On journeys by sea, however, a log of it, hollowed out, is taken in the bows of the boat or canoe for a fireplace.

Gigie. The name on Manu'a of the "Tamole" or "Fiafiātuli," *q. v.*

Horofa. The name on Niuē (Savage Island) of the "A'atasi," *q. v.*

Iī (*Oxalis Acetosella*, L., var. ?) A small, yellow-flowered, ternate-leaved weed.

Ifi (*Inocarpus edulis*, Forst.). Of this there are, in Samoa, several kinds, named as follows :—" O le ifi, fuāmoa," the bird's-egg kind (a small fruit); "O le ifi mānúminümi," the wrinkled Ifi; "O le ifi mea," the pale Ifi; "O le ifiui," the dark Ifi, etc.

O le Ifi-mea. A huge tree, remarkable for its large buttresses at the stem, the great length of its roots, its spreading branches, odoriferous flowers, and thick coated fruit. Wood hard and durable, but used principally for firewood. I have seen slabs of the buttresses used for bulwarks in the war canoes. Leaves alternate, stipulate, ovate-lanceolate, obsoletely articulated with the branches, dark and rather leathery, minutely dotted; the leaves of some of the species are oblong. Stipules

caducous, very conspicuous on the young leaves, but no trace of them on the older ones. Flowers in spikes, solitary, and in whorls along the younger branches. Calyx tubular, with a 2-lobed limb, straw-coloured and thin. Corolla straw-coloured, monopetalous, hypogynous, 5-lobed, regular. Lobes long and narrow, with a corrugated æstivation. Stamens 10, in two rows; the lower in a line with the apex of the pistil; the upper in a line with the base of the lobes of the corolla and alternate with them. Filaments awl-shaped, connate at the base and adhering their whole length to the base of the corolla. Anthers innate, 2-celled. Ovary superior, 1-celled; stigma sessile, 2-lobed. Fruit dehiscent.

Ifiatua. A large tree. Leaves dark green, opposite, exstipulate. Fruit large, somewhat triangular, pendulous; epicarp thick and leathery. Dissepiments 3. Seeds 3–4, angular.

Ifiifi (*Parinarium laurinum*). A large tree, with a rough fruit. Ovary inferior; stamens 16. Pistil 1. Albumen ruminate, astringent, odoriferous, used by the natives for perfuming oil.

Ifilele (*Afzelia bijuga*, A. Gray). A large tree; wood durable and beautiful. Calyx valvate in æstivation; limb 4-cleft. Petals two, by abortion generally only one, white. Stamens 10, three of them very long, red. Style very long. Stigma globose. There are several kinds of this tree, distinguished by the natives as :—Ifi'ulu (smooth grained), Ififatu (hard grained), and Ifisogā (the same).

Kanai. The Niuean name of a twining ternate-leaved creeper. See "Fuemaga."

La, o le la. A branch of a tree (pl o la and lālā).

Lafo, *al.* Lafoā (*Flagellaria Indica*, L.). A cane; grows very high.

Lagaali (*Milnea* sp.?). A tree, with spreading branches, 10–15 feet high, and odoriferous, minute flowers, much esteemed by the natives for perfuming their oil. Wood durable. The native doctors make some use of this tree in dysentery. Leaves mostly opposite, imparipinnate, minutely dotted. Calyx brown, 5-cleft, inferior. Petals 5, yellow; cup of stamens straw-coloured, hypogynous. Ovary superior. Fruit 1- or 2-celled, indehiscent.

Lagaali'ulu. A species with rather larger flowers and fruit than the above, and not so fragrant a perfume. The slender branches of these are used for wattling.

Lala, *al.* Lalatai (*Papilionea*). A large, spreading, twining, arboraceous shrub; leaves small, opposite, ovate, very thick and downy. Flowers yellow. Wood hard; used for pegs in native carpentering.

Lala. A white-flowered, common, papilionaceous shrub.

Lalamea (*Papilionea*). A wild species of Trefoil, purple flowers. Legume 6–8-seeded.

Lalamea, *al.* Lalamelo. The name on Manu'a of the "Fu'apine," *q. v.*

Lalatoa, *al.* Alaalatoa (*Missiesiya corymbulosa*, Wedd.). A small, graceful tree, whose leaves have been used occasionally by some foreigners as a substitute for tea.

Lalano. The name of a tree, said to be very poisonous.

Lama (*Aleurites Moluccana*, Willd.). A tree, about 30–40 feet high. Leaves trilobate, exstipulate, whitish and downy appearance on the back. Monœcious, polypetalous. Stamens fewer than 20. Ovary superior. Fruit (the Candle-nut) 2–3-celled, dehiscent, etc. The kernel oily and in taste much like a walnut, but more oily; eaten occasionally by the natives. When out of paint oil I have used an oil obtained from these nuts as a substitute; it does not dry soon. From these nuts the Samoans obtain their black dye or lamp-black. They burn the nuts under some projecting slab in a cave, the soot rises with the smoke, adheres to the stone, and is then scraped off and carefully preserved in joints of bamboo. This is women's work. The soot is used in tatooing and in painting their native cloth.

Lama-papalagi. Two species: *Ricinus communis*, L., the one whiter and not so tall as the other, introduced; and *Croton* sp., lately introduced, by the Wesleyan missionaries, from Tonga.

Laua'a. The stipular fibrous substance which surrounds the base of the cocoa-nut leaves. Used as a strainer.

Lauāutā (*Gymnogramme tartarea*, Desv.). "The marking-leaf," from the fact that when the back of the frond is placed upon the skin, the powder leaves the figure of the leaf. Called also "Laauāautā," the marking plant.

Lau'avi'avi (*Musa* sp.). The name of a species of Banana.

Laufala (*Padanus caricosus*, Rumph.). The natives use the leaves for making their finer kind of house- and sleeping-mat, and ornamenting their fancy baskets.

Laufagufagu. A shrub, 6–8 feet high, with long lanceolate leaves, striped and spotted with yellow.

Laufagufagu (*Ardisia ?*). A tree, with long, lanceolate, shining, green leaves. Petiole long and large at the base.

Laufatu. The name of a tree.

Laugāpăp'ā, *al.* Laumapăpā (*Asplenium Nidus*, L., and several other Ferns).

Laugasēsē. The name of a species of Fern.

Laulilii. Meaning the minute-leaved. See "Tapu-matau," *infra.*

Lauma'a. The name of a tree.

Laumafatifati (*Cinchonacea*). An arboraceous shrub, used medicinally by the natives.

Laumăfátifati (*Loganiacea*).

Laumafatifati-sina (*Loganiacea ?*). A small tree. Leaves opposite, oblong-lanceolate, entire, dotless. Stipules interpetiolar, caducous. Flowers axile, paniculate. Calyx white, 5-toothed, persistent. Corolla monopetalous, regular, 5-lobed, imbricate, very small. Stamens 5, alternate with the lobes of the corolla and inserted into it. Ovary superior, entire, globose, a little flattened at the apex; style very short; stigma capitate. Fruit a berry, 2-lobed, dehiscent into two parts; the lobes separate from the central placenta, to which a number of red seeds remain attached.

Laumai'a (*Aroidea*). A large-leaved, twining, climbing plant. Leaves often much torn. Worn sometimes by the natives as a temporary substitute for ti- (*Cordyline-*) leaves.

Laumai'e (*Apocynea*). A pretty, twining, small, ternate-leaved scandent creeper, which covers some of the largest trees. Flowers yellow, abounding in milky juice. Seeds, when ripe, black; the juice of epicarp is purple.

Laumaile (*Apocynea*). A small tree with thick twining stems. Leaves in perfect whorls of threes. Flowers yellow, in bloom early in October. This plant appears to be of the same genus as the preceding, but its stem, leaves, and fruit are much larger.

Laumătui. The same as "Avasā-uli," *q. v.* p. 282, *supra.*

Laumā'ulu'ulu. A tree, with very long leaves, like those of *Cordyline terminalis.*

(*To be continued.*)

A NEW BRITISH RUBUS.

We have received from the Rev. A. Bloxam the description of a very distinct species of *Rubus* recently found by Mr. T. R. Archer Briggs, in Devonshire, to which he has given the name of *Rubus Briggsii.* We defer the publication of the description until it can be accompanied with a plate.—EDITOR.

CUSCUTA HASSIACA, Pfeiff.

The Lucerne Dodder which was found on *Medicago sativa*, L., in September, 1851, near Witham, in Essex, by Mr. E. G. Varenne, has again been observed growing abundantly on the same plant near Pembridge, in Herefordshire, by the Rev. J. F. Crouch. Its appearance in both localities is most probably due to the foreign seed which was employed. Dr. H. G. Bull has made a drawing of the plant (not yet figured in any of our British Floras), which, with a description, will appear in the 'Transactions of the Woolhope Naturalists Field Club.' The plant may be easily recognized from our indigenous species by its stalked flowers, which have the odour of the Heliotrope.

FUNGOLOGICAL NOTES.

ROYAL HORTICULTURAL SOCIETY.—With the view of bringing before the public the value of Fungi as articles of food, and to lead to the discrimination of the good from the bad, or at least dangerous, species, two members of this Society offered prizes for the two best collections of Fungi to be exhibited on Tuesday, the 6th of October. Only five collections were sent in, but several of them were large, and contained many interesting species. The principal exhibitors were Dr. Bull, Messrs. W. G. Smith, and J. R. Reeves. The prizes were awarded to the two gentlemen first named. A list of the more remarkable species exhibited will be found in another page. The exhibition was fitly closed with a lecture by Dr. Bull on the dietetic value of Fungi. He illustrated his observations by the specimens exhibited, and pointed out those that should be avoided. Mr. Smith drew attention to the spores of Fungi, and spoke of the difference in size, shape, and colour, of the spores of various Agarics, remarking on the distinction between the white spores of ordinary Agarics and the spinous and sculptured spores of such genera as *Lactarius*, *Russula*, and *Hydnum*.

WOOLHOPE NATURALISTS' FIELD CLUB.—This vigorous provincial association introduced a novelty into its proceedings by devoting a day to explore the Fungi of the district where the Club meets, and after a critical examination of

the species collected, closing its meeting by a feast, the principal feature of which was the edible species which were the spoil of the day's "foray." An excursion so singular and so deserving of imitation by similar institutions, deserves more lengthened notice than we are in the habit of introducing into our pages. Such excursions will certainly bring into notice many species of a tribe of plants which are not only extremely fugacious, but also very enigmatical in their appearance. This is evident from the list of species elsewhere published. They will also overcome popular prejudices against a wholesome and nutritious source of food almost entirely overlooked, and introduce additional valuable species to those who already have found out their virtues, as will appear from the report of the dinner which follows, and for which, as well as that of the excursion, we are indebted to the kindness of Dr. Bull.

The members met at the Mitre Hotel, at 9 o'clock, Friday, October 9, 1868, and after transacting the ordinary business of the Club, they set out for Holme Lacy Park, accompanied by Mr. Edwin Lees, F.L.S., and Mr. W. G. Smith, F.L.S. Leaving their conveyance, and entering the grounds of Sir E. L. S. S. Stanhope, a beautiful group of the maned Agaric, *Coprinus comatus*, attracted attention. It took almost the form of a circle, though not one of those that usually do so. It is very common and as interesting and handsome in appearance as it is good to eat, if people did but know it. The pretty crested Agaric, *A. cristatus*, also edible, and *A. (Mycena) vulgaris*, were next gathered, and on a bank under Scotch fir-trees several specimens of the not very common *Boletus granulatus* were found, and, as a matter of course, some bunches of the common poisonous *A. fascicularis*. A flower-bed in the garden had a fine crop of *Agaricus infundibuliformis* in it, and a cluster of *Boletus subtomentosus* was gathered below the terrace walk. This Boletus was also seen many times during the day.

The Club had a part of their dinner to procure in the park—not in the shape of venison from the deer,—but as vegetable beef-steaks from the trees. Several specimens of *Fistulina hepatica*, the "liver fungus," or "vegetable beef-steak," as it has been called, were met with—one nearly two feet in diameter, and weighing ten or twelve pounds—on nine different trees, and had the search for it been continued many more might doubtless have been found.

Scattered about in proper hunting order the members climbed the hill. They were specially directed to look out for the very rare *Cantharellus cinereus*, which was found here three years since, but which Berkeley marks as "not found since the days of Bolton." It was not found, however. The delicate *Agaricus prunulus*, or *Orcella*, "vegetable sweetbread," as it has been termed, was met with, together with *A. campestris*, *A. arvensis*, and its smaller and more delicate variety *A. cretaceus*, all, of course, edible; and also the small puff-ball *Lycoperdon gemmatum*, the large rough-stemmed *Boletus scaber*, the buff gilled *Russula alutacea*, the less common *R. vesca*, and the Parasol Agaric, *A. procerus*. Some others were collected here not quite so good in character. There was the button of an Agaric, which was thought to be a brown variety of the Fly Agaric, *A. verrucosus*, Bull.; the small *A. alcalinus*, *Lactarius subdulcis*, *A. fumosus*, *A. radicatus*, *A. baccatus*, *A. lacrymabundus*,

the small *Xylaria Hypoxylon;* some rotten wood stained green by the mycelium of a *Peziza*, *Helotium æruginosum*, and the "deadly Agaric," *Lactarius torminosus*, or *necator*. Some fine pale orange specimens of this last poisonous Agaric were gathered, which at first sight resembled the delicious edible "orange milk Agaric," so highly recommended, and figured in the Club's Transactions last year. It had, however, a shaggy woolly margin, without the orange gills and the orange-coloured milk.

In their progress along the hill, and back by Price's walk, the following species were found:—The bright yellow *Boletus elegans; Agaricus fusipes*, good, when cooked; immense clusters of *A. melleus*, beginning to decay; *Hygrophorus pratensis, H. virgineus, H. niveus, H. eburneus*, the elegant *H. chrysodon*, and the rare *H. calyptræformis*, all edible. Their congeners, however, the beautiful scarlet-topped *H. coccineus*, the closely-allied *H. miniatus*, the yellow and rare *H. cerasinus*, the strong-scented *H. cossus*, and the little paroquet Agaric, with its greenish stems, *H. psittacinus*, and *Agaricus æruginosus*, with the pretty white spots from its flocculent veil. Besides these there was found *Polyporus suaveolens* and *P. ulmarius*, *Agaricus appendiculatus*, the pale blue *A. purus*, and the pretty *A. (Lepiota) granulatus*, both edible, if you wish and can find enough of them; the brilliant orange *A. spectabilis*, the poisonous *Lactarius turpis*, and, lastly, numerous rings and patches of one of the very best of all edible Agarics, the fairy-ring champignon, *Marasmius Oreades*, which were abundant enough on the lower grounds.

Returning to their vehicles the members drove to Caplar Wood, memorable as being the locality where Mr. Stackhouse botanized. Mr. Stackhouse deserves an honourable niche in the Woolhope Transactions, for the first synoptical arrangement of British Agarics, as given in Withering's 'Botanical Arrangement of British Plants,' was made by him, and some of his divisions, easy to be made out, might be advantageously used by students in the present day. Caplar Wood and hill seems to have been his favourite haunt, and here, no doubt, the prying old gentleman, in the costume of his day,—cocked hat, knee breeches, and great silver buckles in his shoes,—and perhaps with gold-headed cane in hand, might have been seen prying among the dead matted leaves under the trees of the wood, his eyes sparkling with pleasure as the elegant *Nidularia campanulata*, or a specimen of the great "Club of Hercules" (*Clavaria herculanea* of Withering), both of which he gathered here, met his delighted view.

In this Wood a few specimens were added to the roll of the day, and amongst these was the deadly *Agaricus torminosus*. Very fine specimens of *A. procerus* on the grassy vellum of the camp, and in the hanging woods *A. tener*, *Coprinus nivalis*, *Agaricus (Mycena) epipterygius*, *A. flaccidus*, *Marasmius urens*, *M. peronatus*, and *Hymenochæte rubiginosa*.

As the hour for dinner approached, the party remounted and returned to Hereford. Some time was devoted to an examination of the spoil, and then twenty-one sat down to partake of a dinner which fitly closed the "Foray among the Funguses."

With the fish and the soup came the first novelty in the form of "Oreades

ketchup." It was good with either, and as guest after guest helped himself to an experimental taste, it was curious to hear one after the other ask again for "that bottle." It was a brilliant success. Hie every one with a regard for table luxuries, and that should include all sensible people; hie to your lawns and grassplots and gather while still you may, the pretty little Fairy-ring Champignon (*Marasmius Oreades*), and make for yourselves a ketchup, that is as superior to the ordinary vile black compound you meet with, as champagne is to gooseberry. Don't you know it? Then get a member of the Woolhope Club to point it out to you, or better still, borrow the last volume of the Club's Transactions, and there you will find a pretty coloured picture of it, and receipts, moreover, for cooking it in many ways. Have a care to keep down the spice, however, for if in too great abundance, it destroys the true delicate delicious flavour of the Agaric itself.

A side dish of stewed kidneys narrowly escaped being mistaken for a dish of sliced Agarics, and another of sweetbreads with buttons of the Horse Mushroom (*Agaricus arvensis*) was too good to travel far. Next followed a dish of beefsteak, animal and vegetable, deliciously mingled, to the advantage of both, and at the same time a dish of the *Fistulina hepatica*, the "Liver fungus," or "vegetable beefsteak," by itself was handed round. The slices were cut from the large one gathered in the morning.

The next Agaric to appear was *Hydnum repandum*, "the spiked Mushroom," from Haywood forest. It was stewed and broiled, and those members of the Club who had resolved themselves into a committee of critical taste, and to whom, therefore, all dishes were immediately brought fresh and hot, quickly separated the Agarics from their gravy, and found them excellent, and particularly the broiled ones, not at all unlike the oysters to which they have been compared. Then followed the Parasol Agaric, *Agaricus procerus*, but its delicious flavour, perhaps the lightest and best of all of them, not excluding the common Mushroom, was drowned in its over-condimented gravy.

The Fairy-ring Champignon (*Marasmius Oreades*) appeared then, broiled on toast, after the admirable receipt of Soyer. We give it here in full, for it is the very best receipt for broiling Agarics, or Mushrooms, of every kind.

"Place young fresh Agarics, or Mushrooms, on toast freshly made and properly divided. Salt, pepper, and place upon each one a small piece of butter (or a little scalded or clotted cream). Put one clove on the toast, then cover with a glass and bake for a quarter of an hour, or broil before a quick fire for twenty minutes. Do not move the glass until it is served up, by which time the vapour will have become condensed and gone into the toast, and when the glass is removed a fine aroma of Mushroom will pervade the table." (N.B.—A common kitchen basin will answer the purpose of a glass as a cover for baking equally as well, though it is by no means so elegant.)

A dish of *Agaricus prunulus*, or *Orcella*, was served simply stewed. The Agaric had fair play—salt and spice were kept in due abeyance—and "delicious" was the unanimous verdict. This dish never reached a third of the way down the table!

Many other Agarics might have been dressed, but it was thought best not

to tax too highly the patience of the cook; and so with the distribution of dried specimens of the Fairy-ring Champignon to all who wished it, the feast of Agarics was over for the day. This excellent Agaric will keep well, when threaded on string and dried and kept dry, through the winter, readily imparting its flavour to soups or made dishes as required.

After dinner Dr. Bull read a continuation of the "Illustrations of Edible Funguses," which will appear in the Transactions of the Club for the current year. This was followed by a very entertaining paper by the Rev. J. D. La Touche, on "Why Funguses should *not* be eaten," treating the subject practically, yet in a style which made the paper a model for an after-dinner essay, and supplied material for conversation, in the course of which Dr. Bull successfully and completely answered the Reverend objector's difficulties. Mr. W. G. Smith delivered a lecture on the "Spores of Fungi," and Mr. Edwin Lees read an excellent paper on "Fairy Rings and the Funguses that inhabit them."

It is scarcely necessary to add the following note by Dr. Bull, seeing that the caterers for the feast included that gentleman and other devoted fungological students, but as he gives it, it may be well to add it,—*Three days after the feast*, pleasurable recollections only remain.

BOTANICAL NEWS.

The materials for a second edition of the 'Genera of South African Plants,' by the late Prof. Harvey, having been placed at his request in the hands of his friend Dr. Hooker, the volume has just been published, having received, not only the careful revision of the editor, but the benefit of the labours of General Munro for the *Gramineæ*, of Dr. Masters for the *Restiaceæ*, and of Mr. Baker for the Ferns and their allies. The cellular Cryptogams are not included in the volume.

Prof. Oliver has published the first volume of his 'Flora of Tropical Africa.' In its preparation he has received assistance from Dr. Masters and Messrs. Baker and Hemsley. The volume includes the Orders from *Ranunculaceæ* to *Connaraceæ*, forming an admirable complementary volume for the Flora of Africa to the first volume of Harvey and Sonders' 'Flora Capensis.'

We understand that the 'Flora of Middlesex,' by Dr. Trimen and Mr. Dyer, will be speedily sent to press, and may be expected to be published by Mr. Hardwicke early next year.

The Rev. J. E. Leefe, editor of the 'Salictum Britannicum Exsiccatum,' proposes to recommence the issue of specimens, both British and foreign, illustrating the genus *Salix*. It is hoped that the first part, containing about twenty-five specimens, will be ready to be sent out early in 1869. The price of each fasciculus will be 8*s*., including carriage, which it is expected can be effected by pattern post. Gentlemen wishing for copies, which of necessity can only be limited in number, are requested to apply to Rev. J. E. Leefe, Cresswell, Morpeth.

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ON *HIERACIUM COLLINUM*, *Fries*, A PLANT NEW TO BRITAIN.

BY JOHN HUTTON BALFOUR, M.D., F.R.S., ETC.,
(*Professor of Botany, Edinburgh University*).

(PLATE LXXXVI.)*

On Saturday, 27th of June, 1868, I took a botanical trip to Selkirk with some of my pupils, and while walking along the sandy banks of the Ettrick, between Selkirk and Philiphaugh, a *Hieracium* was gathered by my zealous pupil Mr. Mawson, which at once attracted my notice. It was quite distinct from any of the British *Hieracia*, and it was obviously growing in a wild station. Although, on account of the hot weather of last summer, many of the specimens were in a shrivelled state, still a sufficient number remained in a condition fit for examination. I determined it to be *Hieracium collinum*, of Fries. I subsequently sent a specimen to Professor Babington, who agreed with me as to the species.

The following are the characters of the plant :—*Hieracium collinum*, Fries, Symbolæ ad Hist. Hieraciorum, p. 29; viride (raro glaucescens); caule inferne paucifolio apice cymoso-corymboso furcatove; *foliis* lanceolatis linearibusve acuminatis hirsutis, *subtus cano-floccosis*, infimis lingulatis obtusis; *anthela* discreta *involucrisque e globoso-ovalibus cano-floccosis glandulosoque-hispidis*, *squamis* unicoloribus obtusis, siccitate *nigricantibus*.—*Pilosella major erecta*, Bauh. Pin. p. 262. *H. dubium*, Fl. Dan. t. 1044; Wahlenb. Suec. n. 872 (non Linn.). *H. cymosum*, var. *dubium*, Fries, Nov. p. 253. *H. collinum*, Germ. auctr. pro parte. *H. pratense*, Ledeb. Fl. Rossica. *H. prœaltum*, var. ϵ. *hirsutum*, Koch, Synopsis, 3rd ed. p. 383. *H. fallax*, Hartman, Skand. Flora, p. 19.

It occurs in Northern Europe, and after *H. Pilosella*, Linn., and *H. Auricula*, Linn., it is the most common species in dry mountains throughout the middle and north of Sweden, as far as Lapland, and also in the interior of Norway up to Finmark. It is rare in the mountains of Germany. It flowers in June.

The root is descending, oblique, and premorse, usually giving off stolons. The stem is hollow, straight, with 1–3 leaves, reddish, with

* Read before the Botanical Society of Edinburgh, November 12, 1868.

stellate, hoary, glandular pubescence. The primary leaves are obtuse the rest are lanceolate-acute, covered with hairs which are often crowded and give a floccose appearance to the leaves. The heads of flowers are clustered, the peduncles and involucres being densely hoary-floccose and usually glandular. The capitula ovate-oblong at first, and afterwards more or less globose, becoming black by dryness. The scales of the involucre are floccose and hairy. The achenes are small and brownish-black, with a whitish pappus.

The species belongs to section "C. Stirps *Hieracii prœalti*," and to the subdivision "*Viridi-canescentia*" of Fries's 'Symbolæ.' It is placed near *H. prœaltum*. In its habit, the arrangement of its capitula, its dark phyllaries, and its hoary floccose aspect, it differs from the other British species. It may be looked upon therefore as a well-marked and interesting addition to the British flora.

In Smith's 'English Flora' (vol. iii. p. 356) there is a species of *Hieracium* described as *H. dubium*, L. It is figured in Eng. Bot. t. 2332, and its history is investigated in Smith's 'Observations respecting several British species of *Hieracium*,' published in the Transactions of the Linnean Society, vol. ix. p. 226. Smith states it to be *H. Auricula*, Flora Dan. t. 1111. It is said to have been found in Westmoreland by Hudson, and to have been gathered in Scotland by George Don. It wants the hairy floccose appearance of *H. collinum*.

Another species, *H. Auricula*, L., is mentioned by Smith as having been found by Hudson on Dalehead, near Grassmere, Westmoreland. He gives, as a synonym, *H. dubium*, Flora Dan. t. 1044, and remarks regarding it, "the most uncertain plant, perhaps, in our whole British catalogue, whose place in the English Flora depends on Mr. Hudson's authority alone, for no other person has met with anything in Britain answering to his description." In examining Hudson's description as given by Smith, I do not find that it corresponds with *H. collinum*.

Hooker and Arnott in their 'British Flora' (p. 209) say, "we omit here *H. dubium*, Huds., not L., as it is quite uncertain what plant was intended; the description given by Woodward in Withering's 'Botanical Arrangement' and the figure in Eng. Bot. t. 2332, both of garden specimens, belonging to *H. stoloniferum*, W. and K., while Smith's description in the 'English Flora' is taken from *H. Auricula*, L. We also omit *H. Auricula*, L., said to have been found in West-

moreland, the description and figure, Eng. Bot. t. 2368, given by Smith, being taken from a Swiss specimen of *H. glaciale*, Lach."

Explanation of Plate LXXXVI.; representing *Hieracium collinum*, Fries, from specimens collected on the banks of the Ettrick, Selkirkshire, and communicated by Professor Balfour.—Fig. 1. The plant, natural size. 2. A flower. 3. Bifid termination of a style. 4. A hair of the pappus. Figs. 2, 3, and 4 magnified.

ON VARIOUS SAMOAN PLANTS AND THEIR VERNACULAR NAMES.

By the Rev. Thomas Powell, F.L.S.

(*Concluded from page* 347.)

Laumomole'a. The same as "Momole'a." The plant which, on Manu'a, is called "Laupatālaga." See "Momole'a," p. 359, *infra*.

Lausaato (*Acrostichum aureum*). Used occasionally as a substitute for Sugar-cane leaves in thatching [as is the case in the Isthmus of Panama.—Ed.], and also as a covering next the stone floors of their houses upon which to spread their mats.

Lautamatama. Same as, but less frequently used than—

Lautalotalo (*Crinum Asiaticum*).

Lautūmoa (*Musa*). The name of the spathe of the Banana or Plantain. Called on Manu'a "Lautumanu," in order to avoid using the word "Moa," which is the family name of the king of Manu'a.

Lautuuga. See "Tutuga."

Lauvai. Young taro (*Arum esculentum*, Forst.) sprouts.

Lavai. Leaves of *Bischoffia Javanica* are called by this name when used as stuffing for baked pigs, etc.

Le'ile'i. The name of some rare tree admired by the natives for the beauty of its fruit.

Leva (*Cerbera lactaria*). A tree, about 20 feet high, regarded by the natives as poisonous.

Levavao. A tree, with long lanceolate leaves, spotted with yellow.

Limu. A small creeping plant of the Foxglove tribe (Figwort?).

Limu. Seaweed, Riverweed, Moss.

Limu-aa, Limu alaea, Limu fuafua (an edible species), Limu foe, Limu lauago. Various seaweeds and plants.

Limu-aa (*Alga*).

Limu-alaea (*Alga*).

Limu-ava (*Alga*). An edible species.

Limu-fuafua (*Alga*). An edible species consisting chiefly of air-bladders.

Limu-foe (*Halophila ovalis*).

Limu-lauago, Limu-laumei, Limu-lautaliga (*Algæ, Padina* sp.).

Limu-limulimu. Seaweed detached, duckweed (*Lemna* sp.).

Limulupani (*Vandellia* sp. ?).

Lim-su, Limu-taemoa, Limu-tala, Limu-too (*Algæ*).

Maafala (*Artocarpus incisa*). The name of one kind of breadfruit. Leaves comparatively small and not very deeply incised. Fruit small, oblong, hard, many-seeded.

Ma'ali. A large, high tree, from whose trunk exudes a quantity of odoriferous gum, which the natives use for scenting oil.

Maanunu. *Vide* "Mānuu."

Măea. See "Papona."

Magalo (*Solanum oleraceum*). A plant whose leaves the natives often mix with the taro leaves, in making the native dish called "Palusami," to give it a flavour.

Magéle. A small tree, with alternate, stipulate leaves, and a superior, 4-lobed, furfuraceous, gummy, stone fruit. A tree of another kind is known on Manu'a by this name.

Mafatifati. Same as "Laumafatifati," *q. v.*

Mago. A species of Fern.

Malafatu (*Musa* sp.). The name of a species of Banana.

Malila. The name of some tree.

Mālili. A large tree, whose wood resembles Quebec Oak; it is a good durable wood and very serviceable for boat planks when copper-fastened.

Mălō. A ternate-leaved, small tree, with a red, stone fruit; diœcious. On "Manu'a."

Mamae (*Musa* sp.). The name of a very fine-flavoured indigenous Banana, 3-angled.

Mamala, *al.* Maotamea. A large timber-tree, whose wood is handsome (light brown) and durable; but the working of it causes much sneezing, affecting both nose and eyes.

Māmālάva. A very high, straight tree. Fit for masts and keels.

Manase (*Angiopteris evecta*). The more common name of this is "Nase," *q. v.*

Măniuniu. Another name for the "Sanasana" (*Coix lacryma*).

Mānúnu, *al.* Maanunu (*Cinchonacea*). A small tree, whose leaves or bark are used by the native doctors to prepare a decoction, which is poured into the nostrils in some forms of paralysis; the operation is called "Utu i le supa."

Ma'o. The collective name for several trees.

Ma'osina (*Tiliacea*). A small tree, 8 to 10 feet high; bark light colour; wood whitish. Leaves alternate. Stipules somewhat coriaceous, broad at the base, taper at the end, so as to be almost triangular. Involucre resembling the stipules. Calyx valvate. Sepals 5, leathery, ash-coloured. Corolla imbricate. Petals 5, alternate with the sepals, broad and rounded at the apex, narrow at the base, white. Stamens hypogynous, minute, numerous, distinct. Stigma leafy, 2-lobed, the aperture between the lobes conspicuous. Ovary sessile, hairy, flattish. Carpels consolidated. Placenta axile. Ovules numerous.

Mao'sina (*sina* = white). Another name for the "Uto'uto," viz. *Mussænda frondosa*.

Ma'oui (*ui*, dark). A small tree, with pretty, reddish flowers, of a very different Order from the "Maosina."

Māótă (*Meliacea*). A large timber tree. Flowers bell-shaped, odoriferous, white; hang in strings from the branches.

Maotamea. Another name for the "Mamala," *q. v.*

Măsáme (*Euphorbiacea*). Leaves with minute, caducous stipules. Flowers monœcious, solitary. Petals distinct. Stamens fewer than 20. Ovary superior. Carpels consolidated. Placentas in axis.

Masoā (*Tacca pinnatifida*).

Masōli (*Musa* sp.).

Mata'ema. "A chestnut, 'ifi' (*Inocarpus edulis*), left in store till it separates from the skin." (Pratt. in Vocab.)

Matalafi (*Coffea*). A rather large species, whose wood is used to make wedges of, which are called also "Matalafi."

Matamatāmoso (*Abrus precatorius*).

Matamō. A tree resembling in appearance the "Filimoto," *q. v.*, but with leaves much larger.

Māti. The collective term for various species of *Ficus tinctoria.*

Mātiʻata (*Ficus* sp.). A small species of Fig-tree, from the fibres of whose bark fishing-net twine and small cordage are made.

Mātifanua (*Ficus* sp. ?).

Mātivao (*Ficus* sp. ?).

Mautofu (*Urena lobata*). A pretty, pinkish-white flowered shrub. Leaves lobed, rough, etc. The fibres of its bark were formerly much used, and still are occasionally, for making a fine, dress mat.

Mautofu-tai (*Triumfetta procumbens*). Small, yellow-flowered, procumbent herb. Leaves lobed, rough, fleshy. Fruit a lobed, prickly capsule.

Mauʻutoga (*Commelyna* sp.). Two species, blüe (*C. pacifica*, Vahl) and white. Used medicinally by natives of Tonga.

Milo (*Thespesia populnea*). A large tree, 20–40 feet high. Leaves alternate, heart-shaped, somewhat coriaceous. Stipules very small, deciduous. Calyx double, the inner one, forming an involucre, surrounds the fruit, whose epicarp secretes, when cut, a yellow gum much like gamboge. The wood is much valued by the Samoans for keels for their canoes and for paddles. Some of the finest and largest specimens of *Niphobolus adnascens* grow on these trees.

Moegālou (the Hog's-bed) (*Andropogon* sp.). The Lemon-grass. Much esteemed by the natives.

Moegāpepe (the Butterfly's-bed). A small herb, growing near the sea, upon which the butterflies settle in considerable numbers.

Moemoeao. A very pretty little weed (*Euphorbiacea ?*).

Moli (*Citrus* sp. plur.).

Moli-samoa (*Citrus vulgaris*). This is the name of the Samoan Orange; it greatly resembles one which I have seen from Madagascar. Its fruit is used by the natives as a substitute for soap.

Moliʻaina (*Citrus Aurantium*). Naturalized. Brought by the missionaries from Tahiti in 1836.

Moli-patupatu (*C. medica*). Introduced at the same time as the foregoing. "Patupatu" means lumpy, uneven, lobed, etc.

Moli-tele (*C. Decumana*). This thrives well, but has been nearly extirpated by the natives, as they do not care for it, and see no use in it.

Moli-tai. A small tree, whose fruit is a drupe, which contains a nice edible kernel. I have met with it only on Savaiʻi.

Moloiʻulu. The catkin of male flowers of the breadfruit-tree.

Mōmōle'a* (*Cyrtandra* sp. plur.). There are at least three species of *Cyrtandra*,—all, if I mistake not, called by the above name.

1. A shrub from 2–3 feet high. Stems irregularly square, nodose. Leaves opposite, undivided, large, elliptical, dark green. Inflorescence axillary, paniculate. Calyx deeply 5-parted. Sepals nearly equal, deciduous. Corolla straw-coloured, 5-lobed; tube long; limb flat, nearly equally divided, imbricate in æstivation. Stamens 2. Anthers 2-celled, opening longitudinally. Ovary inferior, 2-celled, many-seeded. Style simple. Stigma bifid, flattened, adhering long after the calyx and corolla have fallen off.

2. Similar to the above.

3. A tree, 6–10 feet high. Leaves lanceolate, dark green. Corolla large, white, much more irregular than the above. Fruit much longer. Inflorescence sessile, axillary, clusters of flowers surrounded by bracts.

Mosooi (*Uvaria odorata*). A large tree, straight trunk. Branches in whorls, spreading almost horizontally. Flowers and fruit odoriferous; the former used by the natives for scenting their oil, the latter a favourite food of the pigeons.

Mosooi-i-tai (*Loranthus insularum*).

Mumuta (*Graminea*). A grass, about 6–8 in. high, with odoriferous bulbs, much esteemed by the natives for scenting their oil.

Muafi (*Gossypium* sp. plur.). Several kinds of Cotton have been introduced, and thrive exceedingly well. In 1863 I planted a few seeds of the Kidney Cotton in my own garden, with a view to induce some of my students to make plantations of their own. September 16th, the seeds were sown in twenty-one holes, about 3 feet apart, after having been divested of every particle of cotton-fibre, and steeped in ash-water; on the 21st following (five days after), they were up an inch above ground, and on the 22nd they measured 4–5 in. from root to leaf. They yielded three crops in about twelve months, and by that time some of the stems were 1–2 in. diameter.

There was on Apolima a very small, stunted, indigenous species of Cotton, a specimen of which I left at Kew with Dr. Hooker in 1866.

Namulega (*Vitex trifolia*). A beautiful lilac-flowered tree.

Nau. The name of a bindweed.

Nausosolo. A neat-looking, palmate-leaved twiner.

* This is called also "Laumōmōle'a," and on Manu'a it is known as "Laupatālega."

Niu. The collective term for Palms (*Palmeæ*).

Niu (*Cocos nucifera*), of which there are several varieties, viz.:— Niu-'afa: the long kind esteemed for the length of its fibre, and preferred for making the 'afa (cinnet). Niualava: the strong-fibred kind. Niui *vel* Niuui: the dark kind. Niufetepulu: much husk and small nut. Niule'a: a low tree. Nut small. Fruit sweet. Fruits early, so that for years persons may pick the fruit while standing on the ground; never (?) attains a great height. Niumea.

Niupiu. The Fan-palm (*Pritchardia pacifica* var. ?).

Niusami. The state of the cocoa-nut when the liquor has an acid taste, and shortly before it is converted into a soft, pulpy mass; it has at this stage somewhat the taste of new ale or beer.

Niutetea. A pale-leaved Cocoa-nut tree.

Niuvao. The name of several species of Palms which grow very tall on the highest mountain of Upolu, especially near the mountain lake Lanuto'o.

Niuvao (*Ptychosperma* sp. ?). The specific name of a species of wild Palm which grows nearer the sea than the above, and whose leaves are premorse.

Nonu (*Morinda citrifolia*). Fruit cooked as a delicacy for the sick.

Nonufiáfiá (*Eugenia Malaccensis*). The varieties are—Nonu-ui, the dark kind; and Nonu-'ulu, the large kind; Nonuvao (the wild or bush Nonu), a small kind.

Nu'anu'a (*Nelitris Vitiensis*, A. Gray). A very pretty shrub, 6–10 feet high, highly prized by the natives; indigenous, but scarce. Thrives well only some 500 feet up the mountains. Flowers small, pretty, pink. The leaves, when rubbed, emit a sweet perfume.

O'a (*Bischoffia Javanica*). Trees 20–40 feet high. Diœcious. The fertile trees have ternary leaves on long petioles. The stipules are very distinct on the young leaves, but they drop off so early as to be only found before the leaf is fully developed. Ovary 3-celled; 2 ovules in each cell, pendulous. Wood red, hard, durable, resists the influence of wet, and therefore, good for posts of houses and gates, etc., but splits considerably in the sun. The Samoans scrape the trunk to obtain from it the gummy juice which they use for mixing their pigments, with which they paint their native cloth (siapo).

Ogogo (*Euphorbiacea*). A weed. Leaves alternate, stipulate, dotted, ovate, serrated; ribs and veins red. Flowers didymous, in axillary spikes; male spikes with large, foliaceous, serrated bracts.

Ogogo (*Fleurya interrupta*). The common Stinging-nettle of the group.

Ogogo-sina (*Leucas decemdentata*). Flowers white and, in general appearance, so like the above as to be called by the same term, and distinguished by its colour, "sina," white. It is remarkable that in country places in England a similar comparison is made by the people calling a white-flowered species of this tribe (*Lamium album*) a nettle.

Ola, Olamea, Olapito, Olasina, Olavai (*Chinchonacea*).

Oli. Another name for the "Fena," *q.v.*

Olioli̅ (*Alsophila lunulata*). Called also "Paogo," and on Manu'a "Pagóă."

Pani. A small tree. Leaves whorled, small, shining, coriaceous, inversely heart-shaped. Petioles erect, long. The juice of this tree is used by the natives for turning their hair brown.

Papaono (*Lauracea*). A large tree. Leaves large, 11 in. by 6 in., oval, emarginate, dotted, exstipulate. Fruit baccate, oval, spice-scented. The natives run a number of these on a string, and wear them for a necklace.

Paoga (*Alsophila lunulata*). The common name of the largest Tree-fern in Samoa (see "Olioli̅"). Used in the dry state as posts for houses and sheds. Caudex 15–20 feet (I have seen one 40–50 feet), diameter 5–7 in. Stipites 14 feet long; base 3 in. broad, 2 in. thick; width of fronds 5–6 feet. Circinate head and base of the young fronds are covered with large, light beautiful scales, which make a most excellent stuffing for pillow or bed. Pith used formerly, in times of great scarcity, as food, and at other times as a delicacy for the sick.

Paogo (*Pandanus odoratissimus*).

Patafatu (*Euphorbiacea*). A tree, 10–20 feet. Large stipules. Prickly fruit.

Pata-mala. A large, high tree, with roundish leaves; the largeness of which render it remarkable.

Pau. The name of a tree with large, sweetish fruit.

Pilíta. A creeper. Leaves digitate; leaflets ovate-lanceolate.

Polo. This is the collective name for several *Solanaceæ*.

Polo (*Solanum* sp.). Small, dark fruit.

Polo-papalagi (*Capsicum* sp. plur.).

Polo-vao (*Solanum* sp.). Flower large, white. Fruit large, globular, red.

Popona. A tree, with leaves opposite, a very small, white flower, and drupaceous fruit. Called on Manu'a, "Măea."

Pua (*Gardeniacea*). A dark green, spreading tree, 12 feet high. Flowers large, white, fragrant, monopetalous, contorted in æstivation.

Pu'a (= Puka) (*Hernandia peltata*). A large, spreading tree, 20 feet high. Leaves entire, cordate, subacuminate, peltate, exstipulate, alternate, dark, shining green. Flowers corymbose; the flowers of each corymb arranged in threes within an involucre of 4 bracts, of these three flowers one is pistiliferous and two staminiferous. Calyx 4-lobed. Petals 4. Stamens 3 and 4 or 6, abortive, epigynous. Disk 4-lobed. Style curved. Stigma leafy, flesh-coloured. The fruit peculiar, being contained within a large, membranous, or rather fleshy, transparent, globular cup. Canoes are often made by hollowing out the trunk of this tree.

Puāneva. A twining shrub with opposite ternate leaves, and long petioles.

Puālulu. A large tree. Wood very hard, used by the natives for making mallets and wooden adzes, called "To'ipua." Flowers monopetalous, regular, æstivation imbricate, sweet-scented; stamens 5, alternate with the lobes of the corolla; stigma 2-cleft, flat; leaf-like. Fruit 1- or 2-celled, placenta parietal.—Very much like the Puāvao.

Puapua. See Pua.

Puapua (*Guettarda speciosa*). A tree. Leaves opposite, with interpetiolar stipules. Corolla monopetalous. The fruit contains a 6-lobed stone, each lobe consisting of 2 wings; the lobes surround a bony, concave axis.

Puapua-lalo-ūlu (*Labiata*). A herb. Leaves small, opposite, dotted, crenated, in whorls on a roundish or obsoletely square stem. Flowers lilac, in terminal racemes.

Puātiali (*Mirabilis Jalappa*). A beautiful crimson flower, which opens about 4 P.M. [" Four o'clock " of the West India colonists.—ED.] Introduced.

Puāvao (*Fagræa Berteriana*). A tree somewhat spreading, 10–20 feet high. Leaves opposite, entire, roundish (many of them halved), minutely dotted, coriaceous, on short petioles arising from a thickened sheath, which embraces the young stem or common axis, and gives it a subjointed appearance. Calyx arising on a stalk from between two thick sheathing bracts, thick, tubular, 5-lobed, persistent, imbri-

cate in æstivation, the 3 inner lobes overlapping each other's edges, the 2 outer lobes opposite each other, and separated by the intervening inner lobes. Corolla a long tube, with 5 equal rounded lobes and an imbricate twisted æstivation, deciduous; stamens inserted into the corolla, all in the same line, just below the lobes, and alternating with them. Filaments short, flat, and thick; anthers on a thick, fleshy, triangular connectivum, 2-lobed, one on each side of the inner sides of the connectivum, bursting longitudinally. Fruit fleshy, consisting of two carpels, 1-celled, many-seeded; placentas parietal, lobed, curving outwards, or, in other words, the edges of the capillary leaves are rolled inwards,—just in the way of the Gentian.

Pu'avai. A large tree.

Pulu. The name of a species of Banana; also the name of the husk and fibre of the Cocoa-nut.

Pulu, *al.* Puluelo (*Capparis* sp.). A small tree of the Caper tribe. Fruit large.

Pulutai (*Euphorbia* sp.). A weed, rather pretty, growing on the sea-beach, 6-8 in. high. Leaf larger and smoother than that of another species which has been introduced, and is very common.

Pupuiono. A small, dark-leaved tree.

Saitamu. A small tree, with hard, durable, heavy, light red wood, used for clubs.

Salato (*Laportea* sp.) "Leaf cordate, but quite smooth," *teste* Wilkes.

Sanasana (*Coix lacryma*). Called also "Maniuniu," *q. v.*

Seă (*Myrtacea*). A large tree. Leaves alternate, stipulate, cordate-acuminate, entire, downy on the under side, smooth and shining on the upper, veins prominent. Fruit an odoriferous, fleshy drupe. Pleasant to the taste.

Séaséă (*Myrtaceæ* sp. plur.) Shrubs or small trees, mostly in damp, shady places, the dots so minute as to be scarcely discernible. The corolla has 4 petals imbricate in æstivation, which does not expand, but separates in the form of a cup or dome before the straw-coloured stamens expand. The fruit is an elongated, somewhat curved, fleshy drupe, purple, white, and yellow. Stone smooth, same shape as the fruit, with a stringy covering beneath the fleshy epicarp.

Selesele (*Cyperacea*). A species with triangular stem, and long slender leaves, with sharp edges. Some of the leaves nearly 1 ft. long. Used for making hats.

Sigano (*Pandanea*). The name of the spadix of flowers of the Fasa, *q. v.*

Sigano (*Freycinetia* sp.) A climbing plant, with long, narrow (2 in.), serrated leaves, and aerial roots which are called "i'e i'e," and are used for caning chairs, sofas, fish-cages, etc.

Soa'a (*Musa uranospatha*). The name of the common mountain Plantain, which has an erect spadix.

Soaasē, Soaa'ulu. Varieties of "Soa'a."

So'apine *vel* Su'apine. The first is the name on Manua, the other the more general name (*Rutaceæ*). Small trees with a strong musky smell. Leaves opposite, on long petioles, ternate, entire, with pellucid dots, base of the petioles subsheathed. Inflorescence axillary and terminal, panicled. Calyx small, regular, with 4 triangular lobes and pellucid dots, persistent. Petals 4, dotted, hypogynous, imbricate in æstivation. Stamens 4, hypogynous. Filaments dilated at the base, tapering at the apex. Anthers small. Disk hypogynous. Ovary 4-parted, 4-celled. Ovules 2 in each cell, pendulous, each attached to an umbilical cord arising from the inner angle of the base of the cell. Style simple, long, flattened, arising from between the lobes of the ovary. Stigma 2-lobed. Fruit consisting of 4 2-seeded carpels, connate, dehiscent, adherent to the calyx. Pericarp filled with reservoirs of aromatic oil. Seeds pendulous, umbilical cord long, attached to the inner angle of the base of the cell.

Soi. A creeper, with a large, rough, dark-skinned fruit hanging from the stem. The fruit ground, washed, and eaten in times of scarcity.

Suni (*Drymispermum Burnettianum*, Seem.). A small tree growing near the sea. Leaves exstipulate, opposite, smooth, entire, on red petioles. Flowers sweet-scented. Calyx tubular, 5-lobed, regular in length, 1 narrower than the others. Stamens 10, in two rows, the upper row of 5 opposite the lobes of the calyx, the lower alternate with them. Ovary superior. Ovules 2 or by abortion only 1, pendulous. Fruit drupaceous, red.

Sunitai. The name of a plant similar to the above.

Taamu (*Alocasia Indica* et *A. costata ?*). There appear to be several kinds. Corms stringy or rather fibrous, and considered by the natives astringent, and consequently of service in diarrhœa.

Taataaiala. The Rarotongan name of a species of "Tamole," *q. v.*

Tāītāiipo. A tree with opposite exstipulate leaves.

Tálāfālū (*Micromelum minutum*). A small tree. Branches slender, somewhat spreading. Leaves shining, green, alternate, exstipulate, minutely dotted. The stamens appear more hypogynous than perigynous; the disk upon which they are inserted, however, has a perigynous appearance; they are not inserted in the calyx, but both the petals and stamens are inserted upon the disk, which is persistent; the ovules, 1–2, are pendulous. Ovary like a twisted leaf. Placenta central, its dissepiments appear like twisted leaves, whose outer edges unite with the sides of the ovary, and form several cells. Fruit a berry, filled with contorted green leaves. Epicarp red, very full of oily cists, and beneficial in a skin disease called the "manemane." A tincture made from these berries has a peculiar and powerful odour, in a diluted form useful in phthisis; mixed with water, it assumes a milky appearance.

Talie (*Terminalia*, sp. pl.). Shrubs and small and large trees. Two or three species or varieties. "Tālieulā (the necklace Talie), the kind from which necklaces are made; Taliefoagia (the Talie that is cracked), "the kind whose fruit is eaten," *teste* Pratt. The former is probably *T. littoralis*, the latter *T. Catappa*.

Tamanu. The timber of this tree is durable, and rather paler than Red Cedar, but very different from that of the tree which goes by the same name in Tahiti (the "Fetau" of Samoa).

Tamole (*Portulaca quadrifida*). A pretty yellow-flowered weed, procumbent, creeping. Leaves alternate, dotted. Stipules woolly. Calyx superior, composed of two thin sepals united at the base. Corolla monopetalous, but having its 5 lobes slit down to the base, giving it the appearance of a 5-petalled corolla. Stamens epigynous. Ovary inferior, crateriform, crowned by an operculum. Styles 6, connate. Stigmas 6, curved downwards. This is called also "Fiafiatuli."

Tamole (*Cinchonacea*). Small herbaceous plant 4–9 in. high, erect. Stem square, rounded at the sides, flat front and back. Leaves with largely developed interpetiolar stipules, smooth, entire, minutely dotted. Fruit a 2-celled capsule, many-seeded. This plant is used medicinally by the natives of Tonga in pains of the head and fever. The Samoans often call it by the name of "Tamole-vai," which properly belongs to another plant, viz.:—

Tamole-vai (*Limnophila menthastrum*). A swamp plant. Leaves

opposite, dotted, emitting when rubbed a very grateful perfume. The lip of the corolla lilac or light purple. Stamens didynamous. Fruit a 2-celled, many-seeded capsule. Used medicinally by the natives.

Tanetane. A small herb, dark green, kidney-shaped leaves.

Tanitani (*Nothopanax Samoense*, Seem.). An arboraceous shrub. Leaflets inciso-dentate, minutely dotted, odoriferous. Inflorescence terminal, umbelliferous, brown.

Tanitani. A smaller species of the same, introduced from Tonga as an ornamental shrub.

Tapaa. The Samoan form of Tobacco, of which many kinds are cultivated.

Tāpúa (*Musa* sp. indigena). Fruit long, sweet.

Tapumatau *et* Taputo'i ("matau" and "to'i" both mean a hatchet). A small tree with small opposite pinnate leaves. Wood hard, good for tool-handles, hence its name, "Hatchet-wood."

Tapuna (*Loranthacea*), also Tupuga. Stems pendent, and curving upwards. Flowers red, erect.

Tātāníā (*Acacia laurifolia*). A tree 15–30 feet. Leaves alternate, concave, 8-ribbed, ovate, exstipulate, shining green. Flowers yellow. Legumes in clusters.

Tauanave (*Cordia subcordata*).

Taulo'u (*Solanum repandum*).

Tausunu. A name given by some to the "Fueselela" (*Hoya* sp.)

Tavai (*Anacardiacea*). A valuable timber tree. Leaves unequally pinnate. Flowers regular, minute, 5-petalous. Stamens alternate with the petals of the corolla. Anthers large, opening by slits. Ovary superior, not lobed. Fruit a very small drupe, 1-celled; the stone flattish, shining, blackish, with a hollow cavity, and the embryo situated next the hilum. The birds are very fond of these seeds.

Tavatavāmanu (*Melastoma* sp.). A very pretty shrub 2–3 feet high, 5-veined roughish leaves, pinkish-white flowers. Calyx hairy, 6-sepalous. Corolla 5–6-petalous. Stamens 10–12. Pistil 1. Stamens doubled down in æstivation. Fruit a dehiscent blackish capsule. Seeds many.

Tavatio. See "Filitavatio."

Tene. A species of Banana.

Teve (*Amorphophallus* sp.). This is one of the plants referred to in the legend of raising the heavens. The chiefs in Samoa sometimes

sentenced a culprit to bite the stem of this plant, but the culprits sometimes succeeded in deceiving them by putting inside its hollow stem a young Banana leaf in its rolled or twisted state, and biting that instead of the Teve, and then making such grimaces as would indicate that they were severely stung.

Teve-manu'a. A variety of the above.

Ti (*Cordyline terminalis*). Of this there are a white- and pink-flowered, and a great number of other varieties.

Ti'ula (*Cordyline ferrea*). Cultivated and much esteemed, being rather scarce. Used only for aprons for special occasions.

Tivao (*Cordyline* sp., an *C. sepiaria*, Seem. ?). Wild.

Tiātuli (*Sida rhombifolia*). A small shrub, yellow flower. Called also "Fanaio."

Toa (*Casuarina equisetifolia*). The natives are fond of planting this around their graves. It requires a dry sandy soil. The wood is valued for clubs.

Togo (*Rhizophora* sp.). The same as "Tupu."

Togai (*Rutacea*). A small odoriferous tree with a straight trunk. Bark brown, speckled with lighter dots or streaks. Branches opposite, spreading. Leaves opposite, exstipulate, entire, cordate, minutely dotted, the upper part of the axis flattened. Flowers in axillary and terminal panicles. Calyx small, 4-lobed, persistent. Petals 4, hypogynous, white. Stamens 8, hypogynous. Carpels 4, consolidated, forming a 4-celled ovary with a pendulous ovule in each cell. Style 1. Fruit 4-celled, 1 seed in each cell. This greatly resembles the "Su'apine;" most likely belongs to the same genus. Used for scenting oil.

Togovao (*Dodonæa viscosa*, L., var. *D. Menziesii*).

Toi (*Alphitonia zizyphoides*). In bloom in April. The heart of the wood of old trees exceedingly durable and beautiful. Yield planks 1–1½ feet wide. Trees of very large size are found on Niuē (Savage Island).

Toitoi-ave'a (*Scævola Kœnigii*, Vahl). A shrub. Stem round and full of an elastic white pith. Corolla monopetalous, one large open lobe deeply sublobed. Stigma surrounded by a fringed sheath. Ovary inferior. Fruit a drupe, containing a hard stone, and crowned with the lobes of the calyx. The natives make a snapping noise with the pith.

Tono. The name of a herb.

Totofufula. A kind of "Ifi" (*Inocarpus edulis*), with very large fruit.

Tou (*Cordia aspera*). "Its wood used for cork; its berries for paste," *teste* Pratt.

Tumanu. The term used on Manu'a for the spadix of the Banana, to avoid the use of the word "Moa," the family name of the king of Manu'a.

Tumoa. The name for the spadix of the Banana on all the islands of Samoa except Manu'a. *See* "Tumanu."

Tupe (*Entada scandens*). The name of the seeds of this large creeper, which are used in the game of "Lafo" or "Lafoga." "Tupe" is the term by which foreign coins are distinguished. Instead of the bean, the Samoans generally use a die made from a piece of cocoa-nut shell.

Tupu, or also Togo (*Rhizophoreæ*).

1. *Rhizophora mucronata.* Tree 6–8 feet, rather dense foliage. Young bark brown. Leaves much further apart than in *Bruguiera Rheedii*, covered on the back with small brown dots. Flowers in small clusters of from 2–5. Calyx monosepalous, valvate in æstivation, 4-lobed. Lobes deeply divided, spreading. Petals 4, opposite the lobes of the calyx. Stamens 8, perigynous. Ovary semi-inferior, 2-celled, containing 4 pendulous ovules. Style short. Stigma bifid. This is not so abundant as *Bruguiera Rheedii*, and grows in deeper water.

2. *Bruguiera Rheedii.* Trees 6–10 feet high. Young bark green. Flowers single, axillary. Calyx 11-parted, the lobes nearly $\frac{2}{3}$ its whole length, valvate in æstivation. Petals 11, the edges of each of which are in æstivation united so as to form a sheath, which contains 2 stamens; the edges and tips of the petals are bearded with shortish hairs; each one has also a long hair at the back or external part at the point where the petal slits on expanding. Stamens 22. Ovary 4-celled, with 2 ovules in each of the lateral cells and 1 in each of the transverse ones. Placenta central. Style long. Stigma 4-toothed, forming a cross. Fruit long, projecting far out of the centre of calyx, which is persistent and inferior or semi-inferior. In bloom from November to January. The Samoans make much the same use of these trees that the Fijians and Tongans do. They used formerly the bow

and arrow. "Aufana" is the name of the bow, "u" the name of the arrow, and "fana" is to shoot. It is scarcely correct, therefore, to say ('Flora Vitiensis,' p. 92) that "the light-skinned Malay Polynesians were ignorant of the use of the bow." All the above terms are genuine Samoan. Foreigners use the wood for charcoal.

Tutuga (*Broussonetia papyrifera*). Called also "Laututuga," "U'a," and "Lauu'a." "Māūnu" is the name given to the young plants. "Tutuga" is the original Samoan term for the plant; "Lauu'a" is the more modern, having, according to the Rev. Mr. Pratt, of Savai'i, "been substituted for 'Tutuga' on account of superstitions in connection with fishing." "Lau-tutuga" and "Lau-u'a" are most properly applied to the bark of the plant after it has been beaten out into thin sheets.

U'a. *See* "Tutuga."

Ufi (*Dioscorea* sp. plur.), several kinds of Yam, *e.g.*:—Ufi'ula, Lo'alo'a, purple Yam; Ufilei, small sweet kind; Ufimasoā, a mealy kind; Ufipo'a, a large kind; Ufisina, the white Yam.

Ufi-ātuli. A creeping, knotted weed with tuberous roots.

Ufi-laau (*Manihot palmata*, var. *Aipi*). The sweet Cassava. Introduced and naturalized.

Ufi-pula, Ufi-soi. Kinds of "Soi," *q. v.*

Uli. Taro sprouts.

Ulu- (=Kulu) (*Artocarpus incisa*). This is the collective term for the different kinds of breadfruit. Care must be taken to give the harsh impulse to the voice in utterance, for without that the word would mean "head" instead of "Breadfruit." There are a great many kinds, for which the natives have separate names, *e.g.*, Ulu-uea and Ulūea, Ulu-fau, U. maa, U. manu'a, U. Vale or Malulu; Asina, Aveave, Avetetele; Maopo, fruit large, soft, round; Maafala, fruit small, oblong, hard, many-seeded; Mase'e, Puou, Puoufatu; Vasivasi, leaves deeply pinnatifid.

Unoi (*Myrtacea*). White flowers.

Usi (*Evodia hortensis*). Much esteemed by the natives. Has doubtless strong medicinal properties, which might be used with advantage in fevers, especially ague.

Usivao (*Evodia Zanthoxylon* var., Benth.). A small tree with ternate leaves. Petals 4. Stamens 4. Pistil 1. Ovary partly inferior.

Usivao. A small tree with yellow striped long lanceolate leaves, amentaceous, monœcious flowers.

‘Uto‘uto, *al.* Ma‘osina (*Mussænda frondosa*). Sometimes one is told that its name is "Aloalo." A small tree or arboraceous shrub. Leaves opposite, stipulate; flowers yellow; tube long, in which the stamens are concealed. Stamens 5. Pistil 1. The white growing on the upper part of the fruit renders this plant conspicuous and attractive.

‘Utu‘utu (*Juncus* sp.). This rush grows in swamps.

‘Uunu (*Meryta* sp.). A small tree 20–30 feet high, 6–8 in. diameter, no branches, but the leaves growing in a whorl at the top of the tree. Petioles 6–8 in. long. Stipules large and coriaceous. Leaves dark green, lanceolate, entire, very large, 3 ft. 6 in. long, 13 in. at its widest part, *i. e.* one foot from the apex, 7½ in. wide at one foot from the base. Ribs very prominent, 2 in. apart; midrib round, very prominent, 1 in. diameter at the base. Inflorescence axillary in capitula of 180–200 flowers, each on peduncles of 12–15 in. long. Calyx coriaceous, slightly 5-lobed, persistent, forming cups projecting above the fruit. Corolla valvate in æstivation, deeply slit into 5 segments as far down as the divergence of the anthers, where it is hairy, the hairs closely surrounding the pistil, and protecting the upper part of the ovary. Anthers adnate. Ovary 2-celled. Style nearly as long as the stamens, simple, green. Fruit a capitulum of united ovaries, 2-celled, 2-seeded. Seeds long, stony.

Vao. The collective term for herbs and shrubs.

Vaotuāniu (*Pteris quadriaurita*).

Vi (*Spondias dulcis=Evia dulcis*). Leaflets serrate, the teeth far apart. Blooms in April. Fruit not so large as some found by Dr. Seemann in Viti.

Vivao (Wild-vi). Leaves pinnate, some of them with an odd leaflet like those of *S. dulcis*. Fruit small, superior, 4-seeded. Placenta central.

Vili *vel* Vilivili. A large spreading tree with very small flowers. In bloom in June. On Aunuu, near the sea.

ON A NEW CHINESE ORCHID.

By H. F. Hance, Ph.D., etc.

Peristylus Sampsoni, n. sp.; tuberidiis oblongis, caule subpedali basi aphyllo vaginato medio folia 3–4 ovato-elliptica acutiuscula basi vaginantia gerente, squama unica bracteis conformi paulo infra spicam sita, spica $1\frac{1}{2}$–$2\frac{1}{2}$-pollicari spirali sublaxiflora, bracteis lanceolatis acuminatis floribus æquilongis, floribus parvis albidis, sepalis conniventibus obtusis postico petalis obtusis margine inferiore lobulo auctis latiore lateralibus iis æquilatis, labello etuberculato trifido lobis oblongis obtusis lateralibus abbreviatis angustis recurvis intermedio iis triplo latiore ac duplo longiore, calcare minuto viridulo scrotiformi truncato, antherarum loculis parallelis, rostello trilobo lobo medio minore, gynostemio utrinque staminodio magno glanduloso auriculato.

Ad cacumina herbida montium Pak-wan, supra Cantonem, ineunte Maio 1868, detexit cl. Sampson (Exsicc. n. 14493).

Closely allied to *P. spiralis*, A. Rich., but differs from that, and apparently from every described species, in the form of the labellum. In general aspect it has much resemblance to the Hongkong *P. chloranthus*, Lindl. (=*Habenaria lacertifera*, Benth.), which, however, has narrower and radical leaves, the stem clothed with long scales, linear and nearly equal labellum-lobes, and an acutish spur.

I merely follow the usually accepted nomenclature in referring this Orchid to *Peristylus*, with the Asiatic species of which it is undoubtedly congeneric; but I would willingly place it in some larger group, did I know how these can be safely and naturally limited. Blume (Mus. Lugd.-Bat. ii. 188) has endeavoured to define the genus more strictly, and refers to it all Lindley's *Cœloglossa*; whilst Mr. Bentham, in the 'Flora Hongkongensis,' has reduced *Platanthera*, *Peristylus*, and *Cœloglossum* to *Habenaria*, I dare say with very good reason. So far as *P. viridis* is concerned, he had been anticipated by the younger Esenbeck, in the Genera Pl. Floræ Germanicæ. *Cœloglossum* is admitted by Prof. Reichenbach fil., but whether he recognizes *Peristylus* at all, and if so, within what limits, I cannot say. The two British species referred by Lindley, Bertoloni, Ledebour, etc., to *Peristylus*, have been thus distributed by modern botanists.

P. albidus.—*Gymnadenia*, Nees jun., Fries, Nyman, Babington,

Rchb. fil., Koch, Visiani. *Habenaria*, Rob. Brown, Hooker and Arnott. *Orchis*, Grenier.* *Bicchia*, Parlatore.†

P. VIRIDIS.—*Platanthera*, Rchb. fil. *Habenaria*, Rob. Brown, Nees jun., Babington, Hooker and Arnott. *Cœloglossum*, Hartmann, Fries, Nyman, Koch, Parlatore. *Orchis*, Grenier,* Willkomm. *Gymnadenia*, Cosson and Germain.

And, according to Bentham, Lindley's *P. chloranthus* is identical with his previously described *Cœloglossum lacertiferum*, so that the unsatisfactory state of the Ophrydeous genera is very evident. They all need careful revision, and no doubt great reduction, the limits of each requiring to be carefully determined from an examination of all the species, exotic as well as European. It is on this account that I have drawn up a longer diagnosis than usual for the Chinese plant. I cannot detect in it, after careful dissection of living specimens, the appendix of the outer anther-valve to which Blume alludes, and appears to regard as of consequence; nor can I make out that he represents such a structure in his figure of *P. grandis* (*tabellen* xxx.); but I have no explanatory text to these very rare illustrations.

NOTE ON *ELÆAGNUS GONYANTHES*, *Benth.*

BY H. F. HANCE, PH.D.

In this plant, which grows abundantly in thickets of the rocky islet in Macao harbour, called 'Ilha verde,' and elsewhere near that settlement, I find a peculiar carpical structure, worth recording.

The accrescent, carnose, perigone-tube, covering the fruit, is most densely clothed inside with a close, long, white, silky cotton, matted together into a tough, pannose texture, so that it resembles the cocoons of 'Shepherd-spiders,' rather than anything else to which I can compare it. This web has not the slightest attachment to the putamen, which in this species is subcoriaceous, not osseous, or might, indeed, perhaps, better be called membranaceous, though thicker than the peri-

* Lindley is quoted by this author (Fl. de France, iii. 298) as referring these species to *Platanthera*, the page of his Gen. and Sp. Orchid., where they are distinctly placed under *Peristylus*, being exactly given.

† See his observations on *Peristylus* (Fl. Ital. iii. 396).

carp.* Whether this curious and most conspicuous indumentum occurs in other species of the genus, I do not know; as, with this exception, not one of the species (about 14 in number) in my herbarium, has good fruit; but I cannot find the least allusion to it in any work I have consulted. These fine plants, very difficult so far as concerns the limitation of species, are much in need of a thorough re-examination, Schlechtendal's monograph in the 'Prodromus' being very mediocre.†

HIPPOPHAË RHAMNOIDES NOT INDIGENOUS IN IRELAND.

By A. G. More.

I am sorry to find that I was mistaken in announcing *Hippophae rhamnoides* as a native of Ireland ('Journal of Botany,' August, 1868 p. 255).

From information just received through Miss Farmar, I learn that the Sea Buckthorn was first planted on the sandhills at Kiltennel and Courtown by the father of the present Earl of Courtown, about thirty years ago, and since that time the planting has been continued by the present Earl,—few years passing without some addition being made.

It is interesting to observe in how short a time the *Hippophae* has become completely naturalized. The present instance may serve also as a caution against deciding too hastily in favour of any plant being indigenous, even when it presents every appearance of being perfectly wild.

Glasnevin, November 7th, 1868.

MONŒCISM IN *LUZULA CAMPESTRIS.*

By Thomas Meehan.

The recent discovery that many plants structurally hermaphrodite

* I have adopted for convenience (I do not know the development history), Schlechtendal's nomenclature, which differs in interpretation of the parts from that of Theodor Nees and Endlicher.

† Since this was written, I have been able to examine fruiting specimens of *E. macrophylla*, Thbg., gathered by the late Mr. Oldham, in which I find a similar structure to that described above.

are practically monœcious or diœcious, in consequence of the flower being so arranged as to prevent self-impregnation, is so interesting that every additional fact bearing on the subject has a value.

Luzula campestris, De Cand., adds another to the list. The three stigmas are protruded through the apex of the flower-bud some days before the sepals open and expose the anthers. In the specimens I marked for observations, six days elapsed before the flower opened, after the pistils had been protruded to be operated on by the pollen of other flowers. This was in a cloudy week, and probably the exact time might vary with the weather. In all cases the stigmas wither away before the flower opens.

After fertilization the stigmas generally twist around one another; and after the anthers have shed their pollen, they twist in the same way, withering up in a very short time. An interesting fact in *Luzula* is the slight adhesion at the articulation of the subpedicels with the main flower-stalk,—the gentlest force being sufficient to draw them out of their sheaths. It is perhaps owing to this weakness that the pedicels are often drooping when in fruit.—*Proceedings of the Acad. of Nat. Sc., Philadelphia*, 1868, *p*. 156.

NEW PUBLICATIONS.

Compendium of the Cybele Britannica; or, British Plants in their Geographical Relations. By HEWETT COTTRELL WATSON. Part First. Thames Ditton: Printed for Private Distribution. 1868. (Pp. 200.)

We welcome this, the first part of an important addition to British botanical literature. The well-known book of which it is an abridgment is in the hands of most of those who take an interest in the topography of our native plants; but, however valuable, it is an awkward book to consult, in consequence of its bulk, and of the numerous additions to previous volumes in volume three, and in the 'Supplement' printed in 1860. The circumstances under which the new work is issued are these: Though the printing of it was commenced in January, 1868, other botanical employment unexpectedly prevented the author from completing the manuscript. He has now judged it

advisable to print off 200 pages as a first part, hoping to be able next year to send out a second part, and a third in 1870. The whole is to be ultimately published "in the usual way."

The nature of the book is best expressed in its author's words; it is "a corrected condensation of the original work," that is, it is almost rewritten, and replaces altogether the first three volumes of the old 'Cybele' and the 'Supplement,' whilst the fourth volume of that work remains as a second volume to the 'Compendium.'

"Introductory explanations" occupy seventy-eight pages, and relate to the divisions of Great Britain and the zones of climate, illustrated by a map, and to the "types" of distribution, and claims to nativity of British species. In the main, all this is the same as that given in the original work, but it has been much condensed and simplified, and is a clear and terse exposition of the subjects treated of; the explanation of the "types" has been much improved; and we are also glad to see the introduction of a useful term, "casual," for expressing a chance straggler from cultivation. In pages 43–59 Mr. Watson has thought fit to go into the Darwinian theory at some length; he shows with considerable force that the process called "natural selection" can never *originate* either varieties or species, though it may conserve them; and he also brings out more clearly an idea hinted at in the 'Supplement,' p. 32, that the convergence of the characters of nearly-allied species should be allowed more weight in attempting to account for the production of varieties. This is a suggestive notion, though somewhat difficult to lay hold of, and seems deserving of attentive study and consideration.

Only the "natives" and the "denizens" and "colonists" are to be included in the two first parts; the "aliens," "casuals," extinct species, and plants erroneously recorded, as well as all the recent segregate species, the distribution of which is as yet imperfectly ascertained, will be treated of in an appendix or general commentary, which will, it may be supposed, form part three. We hope that the exotic distribution of the introduced species will be shown as fully as in the case of the natives. With the important exceptions just mentioned, the present part contains the species of the 'London Catalogue of British Plants' (ed. 6) as far as *Linnæa borealis*, *i. e.* 487 species. The number prefixed to *Linnæa* is 511; but the remarks on this subject we had occasion to make when noticing the 'London Catalogue'

(Journ. Bot. v. pp. 217–219) in great measure hold good with reference to the present list. It is, indeed, very difficult to see what purpose is served by the numbers in the 'Compendium.'

Each species is treated in accordance with a fixed formula, to the explanation of which pages 62–78 of the introductory portion are devoted. It consists of seven lines, the first four of which relate to the distribution of the plant in Great Britain, and the remaining three to that throughout Europe and other extratropical parts of the northern hemisphere. The "census" at the beginning of the fourth line giving the number of provinces, subprovinces, and counties (including vice-counties), in which the plant has been satisfactorily determined to be a native, must give a very just estimate of the real frequency of each species. It is followed by a "census" for Ireland, founded on the recently-published 'Cybele Hibernica' of Messrs. Moore and More. The exotic distribution does not, says the author, pretend to be complete; from various causes such completeness is almost impossible. We may, however, feel sure that in this, as in most work of Mr. Watson, the sins are chiefly those of omission, and the errors are few; in any case, it is far more complete than anything else of the sort in existence.

In this immense collection of recorded facts there is nothing that calls for special critical notice, but we cannot allow a remark on page 60 to pass without a protest. Mr. Watson says,—"Our truly reliable records scarcely extend back one century. Really careful observations and reasonings on the nativity of species can scarcely be dated back half a century." He proceeds to say that, "even at the present day, the records made by a large number of the locality-reporters are too often unreliable" from various causes. To the latter statement we must give a regretful acquiescence, though we believe that greater accuracy now exists than was the case twenty or thirty years back, an improvement due in great measure to Mr. Watson's writings. But, as to the former quotation, every botanist who has really worked at the old books and herbaria,—and with them we fear Mr. Watson can scarcely be reckoned,—will give it an emphatic contradiction. No modern botanist's records are more "truly reliable" than those of Ray, Dale, Doody, Buddle, and others in the seventeenth century, and those of Lobel, Johnson, and Parkinson in the sixteenth are probably equally so, though less easily verified. The errors with which these

old botanists are credited are far more often those of some modern, who has not taken the trouble to determine the species intended, or, perhaps, even to quote correctly. This is not the place to go into details, but it would be easy to give many examples. Those, of course, who go to "local guide books, county histories, and such-like publications" alone for antiquarian botany will meet with innumerable errors. We can say without hesitation, that if British botanists would study the ante-Linnæan authors more than they do, they would obtain much important information both on the distinguishing characters and the nativity of species.

It is almost fault-finding to notice a slight omission in so compendious a book, but we think the name Davuria (often found in line 6 of the formula) required definition as a region little known to the generality of persons; and we should have scarcely considered that even Mr. Watson's low estimate of ratiocinative capacity in British botanists would have necessitated his informing them that "the non-European plants found in Greenland and America are non-British also." (P. 76.) These are small blemishes in an excellent and useful work, which we hope to see finished in good time; but we would suggest to Mr. Watson not to introduce into English literature any more such words as "penni-facture" and "puelline."

Flora Europæa Algarum Aquæ Dulcis et Submarinæ. Auctore L. Rabenhorst. Sect. I. Diatomaceæ, pp. 359. Sect. II. Phycochromaceæ, pp. 319. Sect. III. Chlorophyllophyceæ, Melanophyceæ, et Rhodophyceæ, pp. 461. Leipzig, 1864–68. London: Nutt.

Journals of botany are seldom, from a commercial point of view, "good properties," even when they seek by variety to meet the wants of students in all departments of the science. It is somewhat humiliating that so many promising periodicals have been doomed to a short life full of struggles, and that many even of the oldest and most important journals are known to be kept up more by the energy and devotion of their editors than by the patronage of the botanical world. It was under these circumstances a bold venture when Dr. Rabenhorst, in 1852, originated a journal devoted to a section of Systematic Botany, and that section not having much favour among scientific students. The 'Hedwigia' has however been a success. For sixteen years it

has been ably conducted, and has proved a very useful source of information to, and medium of intercommunication among cryptogamic botanists, and it is yearly becoming more useful and important.

Years before the 'Hedwigia' was established, its editor had been engaged in a not less important work for the same class of students—the publication of specimens of European cellular cryptogams. By the help of a large number of correspondents scattered over Europe, some of whom are well-known British naturalists, he has succeeded in supplying the herbaria of his subscribers with carefully named specimens of a very large proportion of the cryptogamic plants of Europe. It must be evident to those consulting these valuable publications that while Dr. Rabenhorst performed his work as editor with great care in reference to all the Orders, he is specially interested in the *Algæ*. And as the result of this devotion we have the Flora, the title of which is prefixed to this notice, just completed. In this work he brings together all the experience and observations which these labours, in which he has for so many years been engaged, has supplied. The result is a valuable critical exposition of the fresh and brackish water *Algæ*, which must be in the hands of every student of this Order of plants. As algologists too frequently confine their attention to the marine species, this work is all the more important. It fills a desideratum in the flora of Britain, as it does in that of Europe. Since Hassall published his 'Freshwater Algæ,' nothing has appeared in this country dealing systematically with these plants. That work is now not only out of print, but also quite out of date. Dr. Rabenhorst introduces in this, as he had already done in his 'Cryptogamic Flora of Saxony,' a woodcut of each genus, which will prove of great assistance to the student in appreciating readily the characters on which the genera are founded.

Monographie der Gattung Silene. By Dr. P. Rohrbach. Pp. 249. With Two Plates of Seeds. Leipzig: 1868.

This is an admirable and exhaustive monograph of the genus *Silene*. An introduction of sixty-one pages is devoted to the morphological and structural description of the genus, and to an exposition of its position in the Natural Order. The following is the author's synopsis of the genera of *Lychnideæ*, as far as regards the representatives of the tribe in the 'British Flora':—

I. Fructus capsularis.

a. Fructus isomerus, carpellis sepalis alternis . . . . *Agrostemma.*

b. Fructus oligomerus, vel, si isomerus videtur, carpellis sepalis oppositis.

α. Capsula unilocularis.

* Capsula simplici stigmatum numero dehiscens *Lychnis.*

* Capsula duplici stigmatum numero dehiscens.

Semina dorso biseriatim cristata . . . . *Heliosperma.*

Semina tuberculata . . . . *Melandryum.*

β. Capsula basi plurilocularis.

Capsula duplici stigmatum numero dehiscens . *Silene.*

Capsula simplici stigmatum numero dehiscens *Viscaria.*

II. Fructus baccatus . . . . *Cucubalus.*

In the systematic portion of the work 288 species of the restricted genus are described. Dr. Rohrbach has avoided the two extremes either of uniting really distinct forms, or of establishing species on unimportant and inconstant characters; and, what is very rare in the execution of so extensive and critical a monograph, he has carefully wrought up the materials already published, and so successfully referred all the specimens he has examined to establish species, that we find his name appended to less than ten out of nearly 300 species described. Having given the divisions of *Lychnideæ* as bearing on British botany, we will here extract the classification and nomenclature adopted by the monographer for the British species. He excludes two of our species from his restricted genus, viz. *S. noctiflora*, L.=*Melandryum noctiflorum*, Fries, and *S. alpestris*, Jacq.=*Heliosperma alpestre*, Reichb. The remaining species are given as follows:—

Subgenus I. BEHEN.

Æstivatio petalorum imbricativa. Calyx fere semper ampliatus, 10- vel 20-nervius, nervis reticuloso-venosis raro tantum superne bifurcatim conjunctis. Species perennes.

1. *S. maritima*, With.
2. *S. Cucubalus*, Wib. Prim. Werth. p. 241 (1799). *S. inflata*, Sm. Fl. Brit. p. 467 (1800).

Subgenus II. SILENE.

Æstivatio petalorum alternatim contorta. Calyx aut 10-nervius, evenius vel nervis anastomosantibus, aut 20- 30- vel 60-nervius, nervis haud anastomosantibus.

§ 1. *Conosilene.*

Calyx 30-nervius evenius, fructifer e basi ampliata ad apicem versus attenuatus. Herbæ annuæ.

3. *S. conica*, L.

§ 2. *Eusilene.*

Calyx 10-nervius, evenius vel nervis anastomosantibus.

Sect. I. Cincinnosilene.

Flores in cincinnis simplicibus, breviter vel raro longe pedicellati vel subsessiles.

4. *S. Gallica*, L.

Forma genuina, calyx pili adpressi, fructus erecti vel patentes.

S. Anglica, Reichb. Ic. Germ. 273! non Fl. Exc. nec L.

Forma ramosior minus pilosa, fructus reflexi.

S. Anglica, L. Sp. Pl. i. 416, non Reichb.; Curtis, Fl. Lond. ii. t. 50; Eng. Bot. t. 1178!

Forma petalis macula puniceo-sanguinea, limbo albido.

S. quinquevulnera, L. Sp. Pl. i. 416; Eng. Bot. t. 86! Reichb. Ic. Germ. t. 272!

Sect. II. Dichasiosilene.

Flores in dichasio plus minus composito, dichasii ramis æqualibus vel inæqualibus, ramo altero in speciebus paucis in florem unum reducto, aut in speciebus perennibus caulis uni- vel bi-florus.

Series 4. *Nanosilene.*

Species nanæ unifloræ; calyx campanulatus; stigmata 3.

5. *S. acaulis*, L.

Series 7. *Compactæ.*

Species annuæ biennes vel raro perennes; flores in dichasio capituliformi brevissime pedicellati; calyx nervis apice bifurcatim conjunctis; petala integra vel emarginata; stigmata 3.

6. *S. Armeria*, L.

Sect. III. Botryosilene.

Herbæ perennes suffruticesve. Flores in racemo simplici vel composito, racemi ramis aut brevibus paucifloris aut elongatis iterum racemosis vel cymuliferis vel, omnibus cymarum internodiis abbreviatis, verticillastriferis, interdum axis primariæ intra inflorescentiam internodiis contractis flores capitulum formantes;—raro abortu caulis tri- vel uniflorus.

Series 5. *Otiteæ.*

Flores in racemis simplicibus vel compositis verticillastriferis; pedicelli ima basi binis prophyllis præditi.

7. *S. Otites*, Sm.

Var. *a.* genuina.—*S. Otites*, Sm. Fl. Brit. ii. 298; Eng. Bot. 85!

Series 8. *Nutantes.*

Flores nutantes. Ungues et filamenta glabra.

8. *S. nutans*, L.

Series 9. *Italicæ.*

Flores erecti. Ungues ciliatuli; filamenta glabra.

9. *S. Italica*, Pers.

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ERRATUM.

P. 323.—In the explanation of the plate of *Scirpus parvulus*, Nos. 8 and 9, instead of "leaf," read *barren stem.* Figs. 1 and 2 give an appearance of two sheaths surrounding the base of the stems, which is incorrect, as there is only one.—A. G. M.

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